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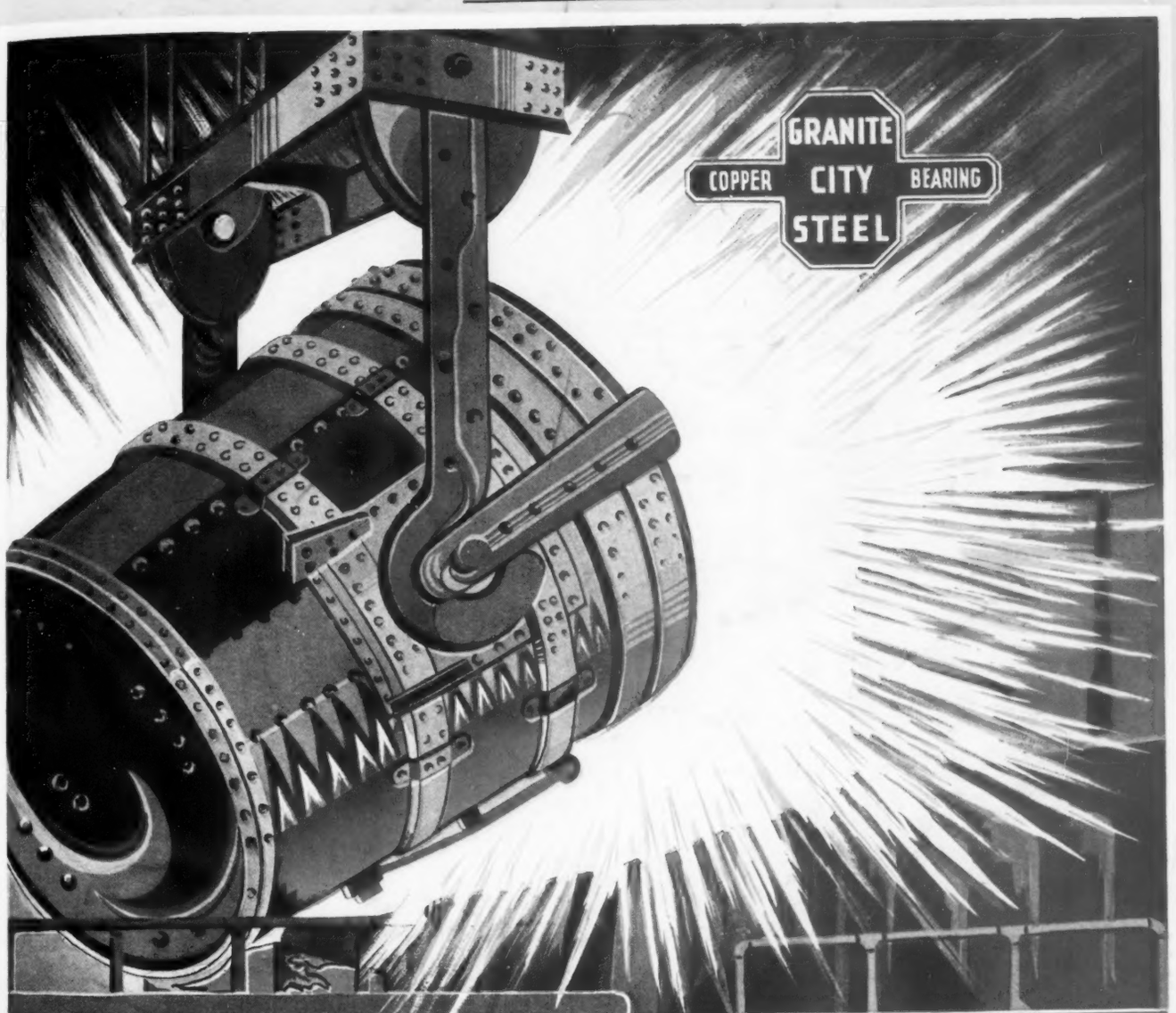
STEEL

For forty-eight years—IRON TRADE REVIEW

December 25, 1930



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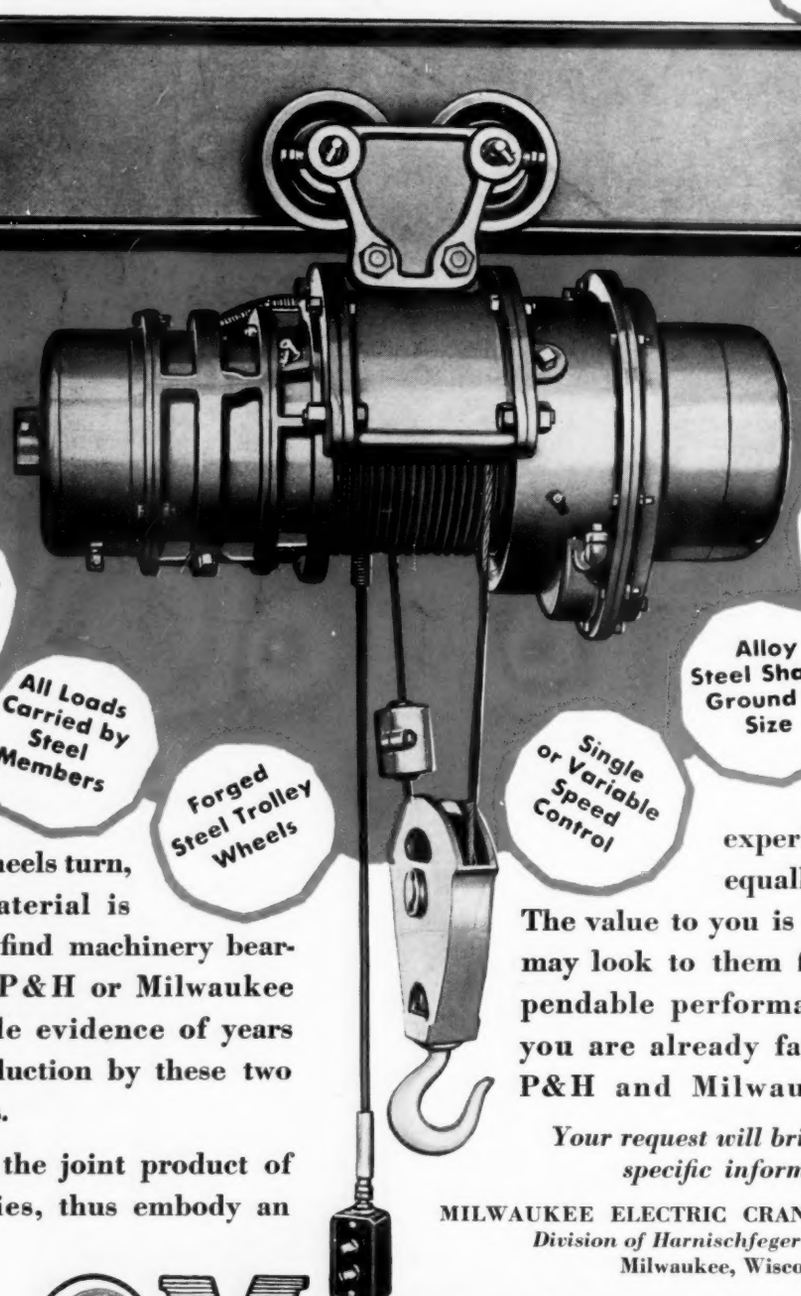

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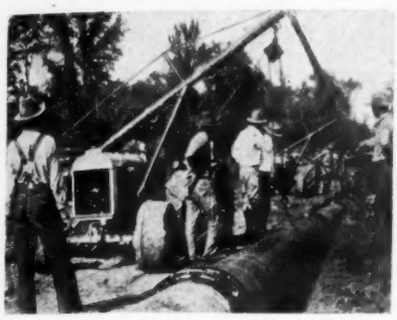

Heat Treating Couplings and Flanges for Long Distance Gas Lines. Page 43

THIS WEEK:

MORE machine tool improvements have appeared in the last six months than in any similar period within the memory of those identified with the industry, according to the editor of STEEL'S *machine tool and shop equipment department. Originators and designers "took their brains out of cold storage" in 1930 and put them to work to devise simpler, more automatic and efficient units, and the results of their efforts are certain to be more generally recognized. A review of Engineering Progress is one of the features of* STEEL'S *"Yearbook of Industry" —the Jan. 1 issue.*

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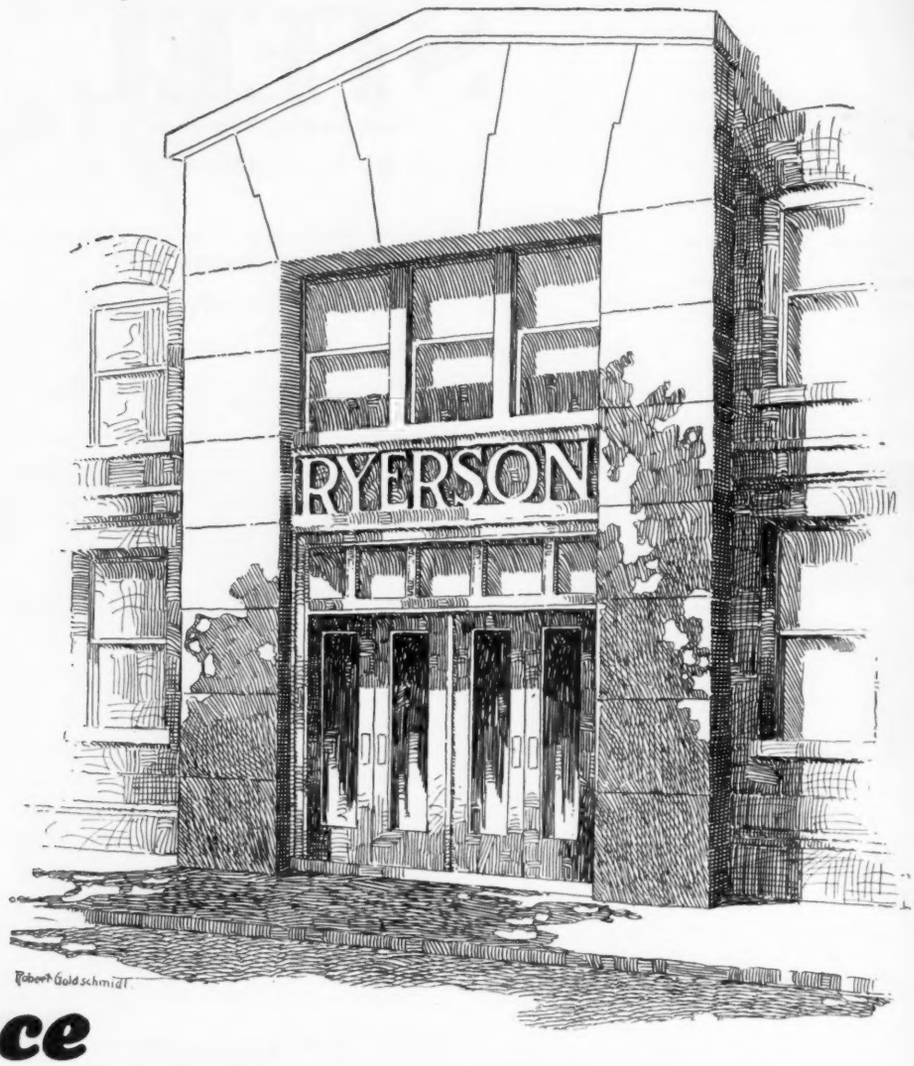

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Volume 87 Number 26

STEEL

For forty-eight years—IRON TRADE REVEIW

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE

This Week in Steel

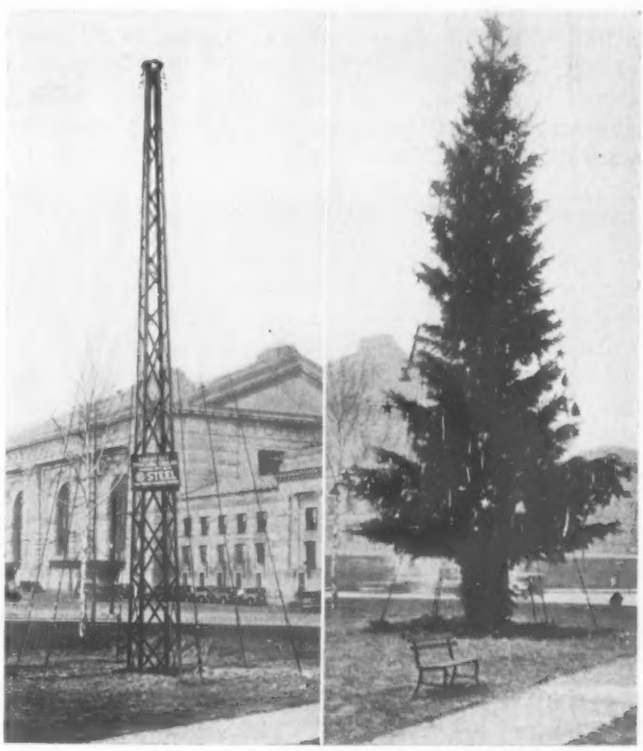
LOW as activity will dip in the next week or ten days—and for some industries it will be to a point not plumbed in at least six years—sentiment will not be depressed proportionately. Rare is the executive who has not learned to discount the holiday and inventory letup at the year's end, and, after entertaining hopes through much of 1930 that were cruelly betrayed, industry is in a patient mood, resigned to a gradual rather than a rapid recovery in 1931 (Page 36). . . . Next week will be loosed the usual New York flood of reviews of 1930, which will make dreary reading, and forecasts for 1931. Because after-events proved so many commentators on business over-optimistic for this year, the tendency in previewing 1931 is likely to be toward under-statement. But not for nothing has business become shockproof. . . . Col. Leonard P. Ayres, bank economist of Cleveland, epitomizes the policy of telling the worst when he predicts (Page 37) that the quarters of 1931 in turn will be "terrible, bad, poor and fair," exactly reversing the order of this year. . . . On the other hand, Charles F. Abbott, of the American Institute of Steel Construction, evaluates the recent efforts of steel producers in advancing prices as "marking the turn of the depression" (Page 23). . . . And E. M. Herr, vice chairman of Westinghouse, declaring that the long pull economically is upward despite setbacks like this year, is convinced that the inroads of labor-saving machinery in reality have lowered the cost of manufactured articles sufficiently to raise the standard of living and increase actual wages (Page 24).

Mechanization Aids Efficiency, if Not Labor

To what extent mechanization is responsible for the present wave of unemployment is moot, but there is no doubting that it has greatly enhanced the efficiency of industry. A government report on the iron ore industry shows (Page 28) that from 1919 to 1929 the horsepower employed at the mines doubled per wage earner, the number of active mines was reduced 53 per cent by concentration of production at the lowes-cost mines, while the number of wage earners was lowered 39 per cent. . . . In the production of pig iron and ferroalloys from 1927 to 1929 the census of manufactures reveals (Page 24) a decline of 11 per cent in the number of establishments and 6 per cent in number of employes, yet the value of the products of the furnaces soared $60,000,000 in that period.

Hoover Wins First Round on Points

Even congress has succumbed to the mellowing influence of the holiday spirit, for, just prior



Ordinarily the Christmas tree is supposed to have a heart of gold; in reality the heart sometimes is made of steel. Green boughs from Christmas trees make the charm none the less genuine. The Kansas City Structural Steel Co.'s signboard on the bare trunk says: "Steel—The Perfect Building Material"

to making a speedy getaway from Washington, it voted the President $116,000,000 for emergency public construction work and $45,000,000 for drought relief (Page 28). On points, the President wins the decision in his bout with congress, inasmuch as he retains close control over the expenditure of the $116,000,000, there is nothing compelling him to spend all of the $45,000,000 appropriated for drought relief (he asked only $25,000,000) and the rider proposing that part of this fund he expended for foodstuffs for the unemployed—which some construed as an entering wedge for a dole—was dismounted in the house.

Fight Looms Over Unemployment Insurance

The holiday over, employment relief will continue a major topic at Washington, although industry chooses to minimize public references to it and to proceed quietly to create as many jobs as possible. Senator Wagner, of New York, sponsor of a number of labor measures, will propose unemployment insurance, on which the American Federation of Labor itself is split (Page 28). . . . Beginning Jan. 15 the census bureau will conduct a second unemployment census in 20 typical cities (Page 24). . . . In 1931, the President states, $700,000,000 will be spent on federal construction, compared with $253,000,000 is normal 1928 (Page 28). . . . Unemployment is like a flood or earthquake or other physical disaster, says Owen D. Young, chairman of General Electric (Page 28) and as these conditions are combatted so the nation eventually "will master the dread disease of unemployment."

Hope Revives as New Year Approaches

This is the inventory season; its influence runs throughout the markets. An inventory of the good and bad features of 1930 for the steel industry (Page 34) reveals its strongest point was its recognition of responsibility to workers and its stabilization of wage rates; its weakest was the way it permitted unbridled competition to wreck prices, for the sake of unprofitable volume. . . . But though steelworks operations at this season have dropped to 25 per cent, the lowest level for the period since 1924 sentiment is not proportionately depressed (Page 59). . . . Hope is renewed in favorable signs of increasing sheet and structural steel business, and the fact railroads are to place 400,000 tons of rails before the end of the year. . . . November exports of 111,968 tons of iron and steel are down 15 per cent from October; imports of 43,095 tons are up 12 per cent (Page 25).

A Bridge Prize That Is a Prize

If you were an engineering or an architectural student, how would you design a monumental bridge of restrained simplicity over a navigable river in a city of 150,000 population, length to be 1770 feet, width 80 feet, with appropriate provision for night illumination? For such a design the American Institute of Steel Construction will pay two students $1700 in prizes in its its annual student competition (Page 23). . . . The student engineers winning the awards no doubt would be aggressive enough to qualify for positions with eastern plate mills which, in spite of adverse market conditions, have studied their markets, pushed welded plates forward as bases for machinery and developed broad uses for the new alloy plates (Page 25). . . . They would be almost aggressive enough to fit in with the American Manganese Producers' association which, in another brief filed with the treasury, continues militant against the importation of Russian ore (Page 27).

Heat Treating Solves Gas-Conveying Problem

Long distance pipelines conveying gas must withstand pressures up to 800 pounds, throwing considerable strain on couplings and flanges. Heat treating has solved the problem; a compact layout of heating furnaces, conveyors and presses in a manufacturers' plant insuring accurate and uniform properties (Page 43). . . . Imagine a bird cage 152 feet long, 71 feet wide and 50½ feet high! It is one of the world's largest, erected recently in the Bronx zoo, New York, taking 38,000 pounds of copper-bearing steel pipe and 16,000 pounds of copper-clad steel mesh (Page 46). . . . A disorderly condition of plant is responsible for 50 per cent of accidents; improper equipment for 21 per cent; improper construction, 15 per cent; improper materials, 9 per cent; and lack of supervision, 5 per cent (Page 47). . . . The process of obtaining a mirror finish on so-called stainless steel is not accomplished easily or quickly; much depends on the original surface of the metal, a smooth surface permitting the use of finer abrasives. Choice of abrasives and polishing speeds are important (Page 48).

An Iron Church and Many Steel Cameras

Earthquakes and fire hold no terrors for the congregation of the iron church in Manila. Erected in 1891, entirely from puddled wrought iron from Belgium, excepting 12 stained glass windows, the structure is a fine example of Gothic architecture (Page 49). . . . Steel finds wider use in the home as means are found for permanently attaching enameled tile to walls (Page 50). . . . Popularity of amateur photography is responsible for the consumption of 550 tons of steel annually for the manufacture of small box cameras (Page 52). . . . Discovery of beryllium deposited in Canada with subsequent reduction treatment will make the metal, especially useful in aviation, available at $3 a pound, formerly $200 (Page 45).

Scores Congress for Price Criticism; Stresses Steel Selling

CONGRESS, through the spoken action of some of its legislators, chose an unpropitious moment to criticize the steel business because of the inauguration of constructive policies, declared Charles F. Abbott, executive director of the American Institute of Steel Construction, New York, in a recent address before the National Council of Traveling Salesmen's association.

"Overproduction has seemingly made it necessary for some drastic experiments," he said. "As important as steel is to the national existence, the industry has consistently refrained from restricting output or depriving the public of its products. In the case of copper, sugar, coffee, rubber, wheat, cotton and other basic commodities, efforts which have seemingly had their inspiration in price fixing seem to be the only practical remedy.

"Recently one of the important steel companies announced an advance of $1 a ton on a few of the products of the mill. Any one acquainted with the temper of the market will agree that the time was ripe for such action. Because some of the competing mills also advanced prices on similar products, the incident has been brought within preview of certain politicians.

Shows Price Advance's Meaning

"Steel has definitely marked the turn of the depression. That alone is the meaning of the price advance and instead of hurling invectives our legislators in Washington should have received the announcement with hurrahs.

"As a matter of fact, the profits incurred in the operation of the steel industry are not in keeping with the hazards and risks assumed in this important industry. It has been estimated that less than $5 of every $100 of invested capital represents return.

"Unless better prices are obtained it is evident that the steel mills cannot maintain the present rate of employment and wage scales, neither of which have been interfered with during this depressing period when the steel industry has been operating at approximately 45 per cent capacity.

"Again, one of the senators called to the attention of the people that the cost of steel in our bridges and buildings might now be increased, and the consumer be obliged to assume the additional burden.

"This senator possibly did not know that through the standard specification, sponsored by the American Institute of Steel Construction, tht cost of steel in buildings has been reduced approximately $30,000,000 annually.

"We have brought about a standardization and an elimination of wasted, unnecessary steel. Of course, in individual projects the steel industry loses tonnage, but these reduced costs produce additional markets for their product and make larger sales possible."

Mr. Abbott declared that business recovery depends largely upon the ability of the salesman to point the way, in saying:

"Business is set to stage a comeback. There is plenty of money available if it could be released for purchasing. This is a very important time to talk with salesmen. Thousands of employers are now looking for the man who can sell. Factories and shops are failing because they do not have him.

"He does more than anyone else to make work for the unemployed. He can restore business. He is the most valuable man in a time of depression and he does most of all to prevent overproduction.

"The successful salesman frowns upon price cutting. He abhors unethical practices. He is the most wanted man in the world today, as he alone can bring about recovery —the man who knows how to sell."

Steel Founders Schedule Winter Meetings

The Steel Founders' Society of America will hold its annual meeting at Hotel Hollenden, Cleveland, Jan. 29. Other meetings of the society announced by the board of directors are as follows: Sales clinic and regular meeting, Neil House, Columbus, O., March 19-20; monthly meeting, Pittsburgh, April 23; and mid-summer meeting to be held in June.

No meetings will be held in February and May. Steel founders in the Milwaukee district are to meet Jan. 8 for a district session at which Granville P. Rogers, managing director, Steel Founder's society, will be the principal speaker.

Announce Third Competition for Bridge Design Prizes

New York—Prizes aggregating $1700 are being offered by the American Institute of Steel Construction, New York, for the best design of a steel bridge.

There will be two competitions of equal prizes, one going to engineering, the other to architectural students.

The problem is a monumental

WHEN DIRECTORS OF NEW INSTITUTE OF STEEL PLATE CONSTRUCTION MET IN NEW YORK

Left to right are B. P. McDaniel, manager, Leetsdale, Pa., plant of McClintic-Marshall Co.; J. W. Poushey, acting secretary, Plate institute, New York; Arthur Caverno, vice president, Lancaster Iron Works, Lancaster, Pa.; W. P. Wheeler, treasurer, Pennsylvania Engineering Co., New Castle, Pa.; and J. A. Connelly, vice president, Petroleum Iron Works, Sharon, Pa.

Seated: A. O. Miller, president, Petroleum Iron Works; G. P. Bard, New York manager, Tippett & Wood, Phillipsburg, N. J.; and S. E. Fairchild Jr., chairman, Cruse Kemper Co., Ambler, Pa.

Except for Mr. Miller, all are institute directors. Other directors not included in this group are: G. T. Horton, president, Chicago Bridge & Iron Works, Chicago; W. R. Guest, vice president, Birmingham Tank Co., Birmingham, Ala.; George R. McAleenan, president, McAleenan & Co., Pittsburgh; and A. M. Duncan, president, Cole & Duncan, Long Island City, N. Y.

bridge of restrained simplicity as would be erected over a navigable river within the limits of a city of 150,000 inhabitants. It would be 80 feet wide and a total length of 1770 feet. The approaches for a distance of 165 feet would represent retaining walls and abutments. Night illumination would be provided for.

This is the third annual student competition held by the American Institute of Steel Construction.

Progress is Permanent, Says Westinghouse Official

In an address titled "Progress," recently delivered at Springfield, Ill., E. M. Herr, vice chairman, board of directors, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., traced past strides made by American industry and other endeavor to disclose many reasons for feeling confident of the continuation of that progress.

The commercial and industrial depression, he asserted, is not confined to this country alone, but is worldwide. This condition is undoubtedly an aftermath of the World war which caused a stimulation of production facilities unprecedented in scope and effectiveness.

Among facts cited was a survey recently made to show the improved conditions among the laboring man. Instead of the vast recent inroads of labor-saving machinery displacing him in his job, rather has the cost of manufactured articles been reduced so that living standards and wages have been increased.

Mr. Herr made mention of the amazing record of production progress the United States has compiled and showed that in 1927 it produced 42 per cent of the world's pig iron, 45 per cent of its steel, 72 per cent of its petroleum, 50 per cent of its copper.

Blast Furnace Efficiency Indicated in Output Gains, Drop in Stacks' Number

WHILE blast furnace production of pig iron and ferroalloys was increasing 16.8 per cent in 1929 over 1927, according to the 1930 census of manufactures, the number of producing establishments declined 11 per cent and the number of wage earners dropped off 6 per cent.

Yet, at the same time, blast furnace products showed an appreciation in value of an approximate $60,000,000, practically double in comparison with the increase from 1927 to 1929 of the cost of materials, fuel and electric current in making these products.

The increasing trend in the production of nonmerchant pig iron and ferroalloys is evident in the 6,000,000-ton gain from 1927's total of 26,855,811 to 32,582,807 tons in 1929. Commensurately, merchant iron and ferroalloys have suffered, and in the two years remain stationary at 9,751,477 tons in 1929 to 9,374,609 tons in 1927, a gain of only 400,000 tons.

Blast furnace gas used as fuel in net ton coal equivalent was 13,934,033 tons in 1929, increasing one-third from 10,989,100 tons in 1927.

Charcoal iron output fell from 167,573 in 1927 to 122,051 tons in 1929. Coke iron rose from 26,855,708 tons in 1927 to 32,582,727 tons in 1929 and again, coke iron for sale remained stationary at the expense of an approximate 6,000,000-ton upturn of nonmerchant coke iron.

From data tabulated to show changes in the methods of casting, the most noticeable fact is evident in the increase from 22,997,927 tons of 1927 to 29,463,804 tons in 1929 which were delivered molten to steelworks. Machine-cast was inert from 11,290,501 in 1927 to 11,182,817 tons in 1929, likewise sand-cast practically inactive in a slight decline from 1,286,616 in 1927 to 1,176,369 tons 1929. Chill-cast decreased and direct castings made in the blast furnace were up a slight margin.

Following table shows the tabulation of data for the industry made in 1930 by the bureau of the census for 1929, and in comparison with the last census which covers 1927:

	1929	1927
Number plants..	103	116
Wage earners, av. for yr.(1)	26,296	27,958
Wages(2)	$43,025,614	$44,258,499
Material, fuel cost(2) (3)	$607,858,298	$579,555,036
Total value products(2)	$773,098,818	$708,904,238
Blast furnace products	$767,745,506	$706,447,979
Other products	$5,353,312	$2,456,259
Value added by mfg.(4)	$165,240,520	$129,349,202

(1) Not including salaried employes. (2) Mfg. profits cannot be calculated because of lack of certain expense items as rent, depreciation, taxes, insurance, etc. (3) Large expenditure for supplies included in 1927. Data for 1929 limited to cost of materials actually entering into products manufactured. (4) Products' value less cost of materials, fuel and purchased electric current. Figures of 1927 not comparable because of (3).

The Business Week in Washington

PRESIDENT HOOVER has signed bills, passed by both houses prior to the holiday adjournment, appropriating $116,000,000 for accelerating emergency public construction and $45,000,000 for drought relief, principally for the purchase of seeds and feed for livestock. These are the first of the President's unemployment relief measures.

□ □ □

Federal trade commission, in its annual report to congress, asks for plenary authority to search books and records of corporations for information indicating violation of the antitrust laws.

□ □ □

Bills introduced by Senator Reed and Representative Johnson, prohibiting all immigration for two years, will be opposed by Secretary of State Stimson and Secretary of Labor Doak, who would reduce immigration 90 per cent, horizontally, on a national origins basis.

□ □ □

Senator Wagner, New York, has announced his intention of introducing bills in January looking to establishment of unemployment insurance.

□ □ □

Representative Evans, Montana, has introduced a bill levying a duty of 2 cents a pound on copper ore.

□ □ □

Bureau of the census has been ordered to make a second unemployment census survey beginning Jan. 15. Plans for the recount for the determination of 20 selected cities will be made by the secretary of commerce in conference with labor and industrial groups.

□ □ □

President Hoover sent a special message to the senate in answer to a resolution informing that body that Col. Arthur Woods, chairman of his special employment committee, has no report to make on the employment situation. It is expected that one of the senate committees will ask Colonel Woods to come before it shortly to discuss the situation.

□ □ □

Representative Garner, Texas, house minority leader, charged that Secretary Mellon misrepresented facts in his annual report as to federal tax refunds during recent years. Instead of 2.8 per cent of total tax collections as the percentage of refunds, Mr. Garner charged that the proper amount is three or four times that much.

□ □ □

American manganese producers file a reply brief with the bureau of the

customs to that filed by the American Iron and Steel institute in connection with the alleged dumping of Russian manganese ore in the United States, again insisting Russian ore is being dumped here.

Iron and Steel Exports Fall to a Low Figure

Export trade in iron and steel products during November dropped to 111,968 tons, compared with a total of 131,850 tons in October, according to preliminary returns from the department of commerce.

Imports, by the same comparison, rose 4751 tons to total 43,095 tons during November. For 11 months of 1930, imports total 492,499 tons and exports 1,883,037 tons.

Tin plate was the principal product exported, 13,302 tons, followed by black steel sheets with 11,651 tons. In order follows skelp, amounting to 10,825 tons; scrap, totaling 7917 tons; and plates, not fabricated, 6741 tons.

November's principal market was Canada, which took 49,826 tons of iron and steel products, followed in order by Philippine islands, Chile, Argentina and Japan.

The chief import was pig iron, of which 18,292 tons were received.

Cancel Pipe Rate Raise

Trenton, N. J.—Proposed increased freight rates on cast iron pipe and fittings, effective March 20, have been ordered cancelled by the New Jersey Board of Public Utility commissioners, affecting shipments between points in this state. Four cast iron pipe and foundry companies, materially affected by the proposed schedules in minimum loadings of 40,000 pounds, opposed the increase.

Award Propeller Contracts

New York—Erie Forge Co., Erie, Pa., has been awarded contract for four forged nickel steel propeller shafts on bid of $4375, by the Department of Plants and Structures. Atlantic Basin Iron Works, Brooklyn, N. Y., will furnish seven cast steel propeller wheels with a bid of $6030. These are for installation in municipal ferry boats.

Grace Meets Shape Group

Philadelphia—Representatives of the Philadelphia Structural Steel Board of Trade conferred with Eugene Grace, president, Bethlehem Steel Co., recently, discussing the various phases of the fabricated structural steel industry regarding outlook and future developments.

Eastern Plate Mills Seek New Uses, and Expand Bookings

PHILADELPHIA—Aggressive promotion of new business by eastern plate producers has been an important factor in enabling eastern plate mills to operate at a much larger rate of capacity in 1930 than at one time would have been expected, in view of the present relation of plate producing capacity to that in other products.

The eastern plate industry was expanded tremendously during the war because of the large shipbuilding requirements at that time, and the plate mills practically ever since have been forced to content themselves with only a portion of their producing facilities in operation.

This situation in recent years has stimulated the plate interests in their search for new business, and these efforts have been rewarded by a fairly steady growth, contrasted with most other finished steel products, in the general volume of business offered.

Plates Replace Cast Iron Parts

Two or three years ago, it is recalled, the outstanding development in the new use of plates was in connection with foundations for heavy machines, columns, etc., which replaced cast iron parts. At that time was developed the idea of replacing cast iron in a broader way. The past year has witnessed the substitution on an increasing scale of plates for castings.

The plates are cut to size and shape and welded for applications where castings hitherto have been used. The plate mills which have taken the lead in this development point out that the finished plate product is lighter and less expensive than the casting, as a rule, and that in addition there is a saving due to the elimination of patterns' cost.

In the eastern plate producing industry the principles of welding as applied to plates to be substituted for castings have received the keenest kind of studying and these plate weldings now are being used in many installations with the result the plate mills have scored a distinct gain in this direction.

Shipbuilding a Factor

Plate mills in the East also have been either directly or indirectly benefited by the large tonnages of plates being used in construction of ships along the Atlantic coast. While a good deal of this tonnage is being shipped from Pittsburgh, eastern mills also have enjoyed a large share of the business directly and, of course, the indirect effects to mills due to having their competitors book business has been regarded as generally helpful.

Eastern mills have benefited during the past year from a further increase in the development in the use of alloy steel in plates, to withstand acids, chemicals, corrosion, heat or to have special properties of one kind or another.

Each alloy appears to have its own specific use and the mills are keenly alive to the tendency in this direction and believe that as this de-

CLEVELAND STADIUM TAKING 4700 TONS OF STEEL

This structure being rushed to completion by the municipality of Cleveland will seat 77,000 persons. Only Chicago and Los Angeles have slightly larger types. The cost is estimated at $2,000,000 to $2,500,000. Bids were opened Dec. 18 by the Osborn Engineering Co., Cleveland, on 62,000 malleable iron and wood seats, each seat to require 18 pounds of castings

velopment in alloy steels continues there will be a real market in the future.

The chief interest in alloy plates at the present time involves chrome or nickel-chrome steels for resisting corrosion and heat. The use of nickel steel in plates for high pressure locomotives continues to grow. Incidentally, a good tonnage of alloy steel plates has been booked by eastern mills during the past year from foreign railroads, involving shipments to Mexico, Germany, Russia.

More Freight Cars Built; Fewer Are on Order

Class I railroads of the United States in the first ten months of 1930 placed 73,887 new freight cars in service, according to the car service division of the American Railway association. In the same period last year, 68,073 new freight cars were placed in service.

Of the new freight cars 38,443 were box cars, an increase of 5264 compared with the first ten months of 1929. There were also 26,906 new coal cars placed in service in the ten months this year, an increase of 2013 compared with the same period last year. In addition, there were placed in service in the ten months period this year, 3583 flat cars, 3657 refrigerator cars, 913 stock cars, and 385 other miscellaneous cars.

Will Electrify Bar Mill

Preparations are being made to electrify the drive of a 28-inch bar mill at the Duquesne works of the Carnegie Steel Co., Duquesne, Pa. The 28-inch roughing mill will be equipped with a 1600-horsepower induction motor and the 22-inch finishing mill with a 1250-horsepower, 600-volt unit.

Steel Corporation Officials Visit Worcester Steel & Wire Works

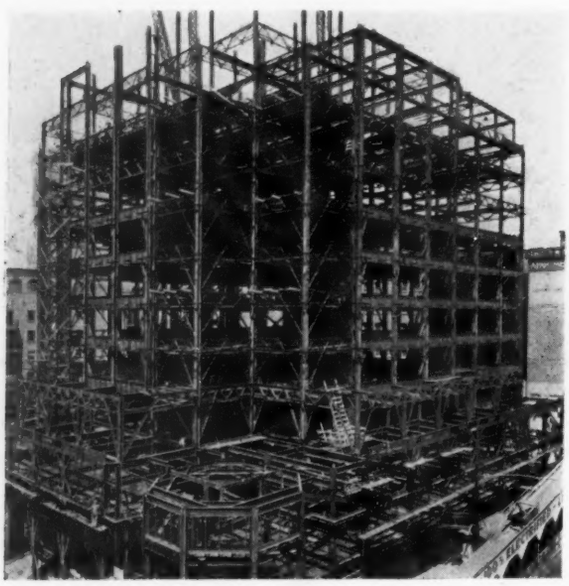
CHIEF executives of the United States Steel Corp. and its subsidiary, American Steel & Wire Co., in conjunction with many leading figures in the industry in New England, participated in a tour of inspection of the American Steel & Wire Co. plants in Worcester, Mass., Dec. 17.

A luncheon at the Bancroft hotel was the occasion of a friendly meeting of the steel executives with a large group of men representative of the interests of Worcester.

Those in the party were: Myron C. Taylor, chairman of the finance committee, United States Steel Corp.; James A. Farrell, president, Steel corporation; John S. Keefe, president, American Steel & Wire Co.; Eugene P. Thomas, A. N. Diehl and John Hulst, vice presidents, Steel corporation; and following officials of the Steel & Wire company: C. F. Blackmer, vice president and superintendent; D. A. Merriman, vice president and general sales manager; J. A. Coakley, vice president and general traffic manager; Lester Perry, district manager, Worcester; Clifford F. Hood and Malcolm W. Reed, assistant district managers, Worcester; Peter Stewart, superintendent, South and Central works, Worcester, and A. J. Hoyt, superintendent of the North works, Worcester.

Included also were: Harry G. Stoddard, vice president and treasurer, Wyman-Gordon Co., Worcester, a former district manager of the Worcester district; and John F. Tinsley, vice president and general manager, Crompton & Knowles Loom Works, a former superintendent of the South works at Worcester.

Among those attending the luncheon were: President J. J. Pelley, New Haven railroad; President Edward S. French, Boston & Maine railroad; Howard M. Biscoe, vice president of the New York Central and president of the Boston & Albany railroad; Charles L. Allen, president, Norton Co.; Clifford S. Anderson, president, Worcester chamber of commerce; George S. Barton, president and treasurer, Rice Barton & Falls Inc.; Nils Bjork, president and treasurer, Worcester Wire Works Inc.; George F. Booth, publisher, *Worcester Telegram* and *The Evening Gazette;* Frank D. Comerford, president, New England Power association; F. Harold Daniels, president and general manager, Riley Stoker Corp.; Admiral Ralph Earle, president, Worcester Polytechnic institute; George F. Fuller, president, Wyman-Gordon Co. Inc.; Dr. Homer Gage, president, Crompton & Knowles Loom Works; Jerome R. George, vice president, Morgan Construction Co.; Aldus C. Higgins, president and treasurer, Worcester Pressed Steel Co.; George N. Jeppson, vice president, Norton Co.; Charles D. Johnson, president, Johnson Steel & Wire Co. Inc; Frank A. Krim, president, Denholm & McKay Co.; Clinton S. Marshall, district superintendent, American Steel & Wire Co.; Samuel C. Moore, vice president and general manager, New England Power Co.; Paul B. Morgan, president, Morgan Construction Co.; Chester T. Reed, president, Reed & Prince Mfg. Co.; George T. Richardson, editor, *Worcester Evening Post;* George I. Rockwood, former president, Rockwood Sprinkler Co.; John C. Stewart, Stewart Boiler Works; Frank H. Willard, president, Graton & Knight Co; Col. Samuel E. Winslow, president and treasurer, Samuel Winslow Skate & Mfg. Co.; and George F. Wright, president, George F. Wright Steel & Wire Co.



Note the portal and knee bracing, deep girders and other bracing against horizontal forces in this Los Angeles structure. Though the growth in population of the city and environs indicates no general fear of earthquake the National Board of Fire Underwriters is doing much to promote special precautions in case of emergency. A shock may not be severe in itself, but is a potential cause of fire

Railroad Scrap Analyzed by Institute Bureau

Steel and iron scrap produced by railroads in 1929 totaled 4,500,000 gross tons, according to figures collected by the research bureau of the Institute of Scrap Iron and Steel, New York. Its figures are based on reports by railroads, which are among the largest producers of scrap.

Of a total of 1,800,915 tons reported by a large group of railroads from

which complete reports were received, 1,030,523 tons were sold to scrap dealers for processing and sale, 411,169 tons were sold direct to consumers and 359,223 tons were not reported as to disposition. Of the tonnage sold direct to consumers a large part is made up of car wheels, which are almost entirely shipped to carwheel manufacturers on an exchange basis.

Of the 1,800,915 tons covered in the complete reports, 1,306,835 tons were sorted and prepared before sale, little scrap from railroads going on the market unprepared.

Industry Expected to Use Less Cars in First Quarter

Pittsburgh—Railroads serving the Allegheny region will use 3.9 per cent fewer cars in the transportation of first-quarter freight than during the corresponding period of 1930 it was estimated at the regular meeting of the Allegheny Regional Advisory board. This district includes eastern Ohio, western Pennsylvania, northern West Virginia and the Maryland panhandle.

Among commodities for which decreased freight traffic is anticipated and the percentage of the decline are: iron and steel 7.7 per cent; machinery and boilers 23 per cent; automobiles and parts 10.9 per cent; agricultural implements and vehicles 9.5 per cent. Increased production is looked for in bituminous coal. Decreases of 13.9 per cent in shipments of iron and steel scrap were estimated.

Washington—Commodity carloadings in the Atlantic States district during first quarter will average 1.1 per cent less than the actual shipments made during the corresponding period of this year, according to estimates submitted at the seventh annual meeting of the Atlantic States Shippers Advisory board.

Chicago—Report of the Great Lakes Regional Advisory board indicates shippers in that territory expect freight shipments in the first quarter will be 6.9 per cent below the first quarter of 1930. Iron and steel should decrease 4.3 per cent.

Plan Pipe Line Conference

New York—A conference of executives of railroads and pipe lines will flow from the recent proposal of the railroads that pipe lines be subjected to regulation by the interstate commerce commission on account of the increasing share of interstate commerce they are transporting.

Daniel Willard, president, Baltimore & Ohio railroad, and H. L. Doherty, head of the Cities Service Co., have assented to the conference.

Domestic Producers of Manganese Reiterate Charge of Dumping by Russia

WASHINGTON—A brief has been filed with the customs bureau, treasury department, by the American Manganese Producers' association in reply to the brief recently filed by the American Iron and Steel Institute, New York, relative to the application of the manganese producers for an embargo against the importation of Russian manganese.

"We have proved," the manganese producers state, "that anything sold at less than cost of production constitutes dumping. Certainly the institute's contention that, since Russia is dumping in all other countries of the world by selling at less than 'fair value,' she can likewise dump in this country by selling at less than 'fair value,' is wholly contrary to the letter and spirit of the antidumping law."

Cites Reasons for High Price

Attention is called in the brief to the fact that, based on figures of the United States tariff commission, the average price paid for foreign ore delivered at Pittsburgh was 68 cents per unit, and the highest price paid for domestic ore of the commensurate grade was 60 cents per unit.

"We can, perhaps," says the brief, "show why steel paid 68 cents per unit, when it was unnecessary to do so. The reasons may be summed up as follows:

"1. That the steel industry might argue before congress that there was little or no manganese produced in the country, and hence, a tariff was unnecessary.

"2. That there was no American industry to protect.

"3. That if the steel industry was not buying, even if there was a domestic industry, it would soon collapse.

"4. That in buying from Russia to help the soviet establish gold credits in this country, it could at the same time prevent the progress of the domestic industry.

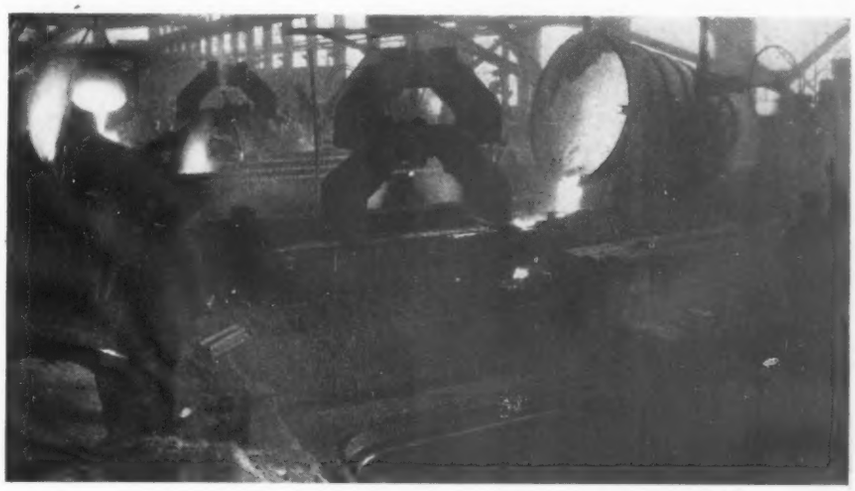
"5. That it could eventually purchase at a much cheaper price due to Russian necessity and the ability of Russia to sell at any price."

Nine Months Railroad Capital Outlay Is Greater

New equipment, additions and betterments to railroad property among Class 1 railroads during nine months of 1930 have embraced the largest capital expenditure, at $698,821,000, of any corresponding period since 1923, according to the Association of Railroad Executives, New York.

Among capital expenditures made for equipment in the three quarters of 1930 are: Locomotives, $66,043,000, a gain of $21,356,000 over 1929; freight cars, $162,356,000 an increase of $36,270,000; and passenger cars, $33,270,000, or an increase of $5,758,000.

Heavier rails have been bought, valued at $40,215,000, compared with $33,995,000 of 1929. For shops and engine houses, including machinery and tools, this year's expenditure has amounted to $24,127,000, slightly more than last year's amount.



POURING 90 TONS OF METAL FOR A TURBINE HOOD

This casting, being made at the General Electric Co., Schenectady, N. Y., is to be part of a 75-ton exhaust hood for a 165,000-kilowatt turbine for the Brooklyn Edison Co., Brooklyn, N. Y.

Major Relief Bills Passed; Employment Insurance Looms

WASHINGTON — Congress adjourned for the holidays without any extravagant raid on the treasury for relief measures but with the promise of a struggle over proposed employment insurance when it reconvenes.

Senator Wagner, New York, sponsor of a number of labor bills now pending, served notice he will introduce a bill putting congress on record as favoring the principle of emploment insurance and providing for an investigation of private and public insurance plans here and abroad.

The American Federation of Labor itself has exhibited a lukewarm attitude on the subject, referring the matter when broached at its last convention to a committee, which some elements in the federation consider equivalent to burying it.

Certain units desire an insurance system, with employes and employers contributing, and the government brought in as administrator of the fund, including representatives of the federation.

Present Plan for Mechanics

According to their plan, a skilled mechanic out of work through seasonal or technological influences would not be required to accept employment in any other line but that in which he has been trained, failing which he would be entitled to insurance.

Hearing by the senate commerce committee on the bills introduced by Senator Reed and Representative Johnson to stop all immigration for two years brought from Secretary of State Stimson and Secretary of Labor Doak a suggestion that the present quotas be reduced 90 per cent instead, as a simple and direct method of limiting immigration without a radical upset of the present sytsem.

Congress finally passed the two relief bills called for by the President, but not exactly as desired by him.

The drought bill provides an appropriation of $45,000,000. The President had asked for only $25,000,000 for this emergency, but there is nothing in the bill making it mandatory to spend the entire amount.

One of the stumbling blocks in the way of the drought bill was whether or not any of the money should be used for the purchase of food. This clause was eliminated. The amount of the appropriation was a compromise, the house having appropriated $30,000,000 and the senate $60,000,000. As finally adopted money is available for loans for the purchase of fuel and oil, tractors, fertilizer, feed, etc.

One of the controversies over the $116,000,000 emergency construction bill was the amendment of Senator Couzens, of Michigan, which would compel contractors to employ local workers. A total of $700,000,000 will be spent by the government on public construction during the coming year. In 1928 the expenditures for this same class of work amounted to only $253,000,000.

Young Confident Nation Will Master Unemployment

Confidence the nation eventually will master "the dread disease of unemployment" was expressed by Owen D. Young, chairman, General Electric Co., in speaking recently to the executive committee of New York's emergency employment organization.

"Unemployment is like a flood, an earthquake or other physical disaster," he said. "We are studying earthquakes, building levees against floods, and gradually diminishing our fire risks, and so today as never before we are studying the laws which govern and the methods by which we can decrease these cycles of recurring economic depressions and the misery they bring.

"The process is slow because no one is in power and no one ought to be. We want no economic dictatorship in America any more than we want political dictatorship. We want to be free men, functioning on our own responsibility, each a part of a co-ordinated whole which determines our destinies for better or worse."

Mine Labor Reduced as Horsepower Increases

Horsepower per wage earner at iron ore mines in the United States doubled between 1919 and 1929, while the number of wage earners was reduced by 38.9 per cent, according to a release by the bureau of the census.

The number of active mines was reduced by 53.3 per cent, although production in 1929 was at the peak. Many mines developed during the war remained active in 1919, while in later years producers concentrated operations at fewer large mines. The census data follow:

	1929	1919
No. of mines	198	424
Wage earners	28,298	46,339
Wages	$41,022,180	$76,698,551
Cost of supplies, fuel, and purchased electric current	$28,403,740	$38,348,411
Cost of development	$10,054,794	$17,360,294
Production:		
Tonnage (long tons)	73,936,641	61,173,254
Value at mine	$200,129,695	$217,949,311
Horsepower rating of power equipment:		
Total	467,718	381,044
Per wage earner	16.5	8.2
Equipment purchased	$4,088,348	.....

Inland Steel Co. Buys Continuous Mill Equipment

Inland Steel Co., Chicago, has awarded contract to the Mesta Machine Co., Pittsburgh, for $3,500,000 to $4,000,000 worth of mill equipment including a continuous wide hot strip and plate mill to be installed at the Inland company's Indiana Harbor works probably next year. Capacity and sizes of material to be rolled are now being worked out and details are undetermined.

Inland Steel Co. recently signed a license agreement with the American Rolling Mill Co., Middletown, O., for a continuous sheet mill.

Night view of Ambassador bridge, connecting Detroit with Canada. Seventy-four hundred feet long, this bridge is 3 feet longer on July 4 than Christmas. Lighting system was provided by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Sheet Sales, Output Reduced; River Traffic Off Seasonally

DAILY average sheet steel sales by independent mills in November dropped 11.6 per cent from October; production decreased 20 per cent, and shipments were reduced 16 per cent. Total sales for November were 135,682 tons, production 148,550 tons, and shipments, 158,182 tons.

The National Association of Flat Rolled Steel Manufacturers, Cleveland, reports unfilled tonnage Dec. 1 as 295,282 tons; approximate finished stock on hand awaiting shipments 88,338 tons, and approximate in stock unsold 96,248 tons. Total sheet capacity in the United States for November was approximately 504,600 tons, and the capacity on which the foregoing figures are based is 341,100 net tons.

River Traffic at Pittsburgh Compares Well With 1929

River traffic in iron and steel products in the Pittsburgh district declined seasonally during November but compared favorably with activity a year ago. The movement over the Allegheny was the largest of 1930 while shipments over the Monongahela and Ohio rivers were the smallest since April. Comparative monthly figures follow:

	Allegheny	Monongahela	Ohio
1929			
Nov.	500	83,189	88,011
(11 mos.)	2,107	1,142,770	1,135,027
Dec.	400	60,957	77,885
Total	2,507	1,203,827	1,212,912
1930			
Jan.	100	58,784	64,736
Feb.	210	80,327	74,385
March	100	111,702	109,911
April	1,000	70,229	66,482
May	.....	117,942	128,502
June	700	137,603	144,099
July	1,125	132,161	147,558
August	2,600	96,498	107,948
Sept.	5,100	106,079	109,129
Oct.	11,490	105,451	138,109
Nov.	17,850	75,202	95,644
(11 mos.)	40,275	1,091,978	1,186,503

Coke Output Recedes; Loss Largely By-Product

A further recession in output featured the November coke industry, which fell off 5 per cent from October. This decline was largely accounted for by the by-product plants, as the beehive daily rate was slightly higher than in October. Citizens Gas Co., Indianapolis, with 40 Wilputte ovens, and the New England Fuel & Transportation Co., Everett, Mass., with 67 Koppers ovens, were the two installations placed in operation in the month. Comparisons follow, from bureau of mines' reports:

(In net tons)

	By-product coke	Beehive coke	Total coke
1929			
Nov.	4,321,494	413,300	4,734,794
(11 mos.)	49,294,880	5,670,100	54,964,980
1930			
Nov.	3,137,110	167,500	3,304,610
(11 mos.)	42,437,218	2,593,800	45,031,018

Foundry Equipment Decline in New Orders Continues

At a low for at least three years, November foundry equipment index of gross orders dropped five points to 45.3. The three-month average of orders was consequently off, as was the index of unfilled orders, though shipments rose from the October level, according to summary of 20 companies reporting to the Foundry Equipment Manufacturers' association, gross order indexes of which follow by months:

	1927	1928	1929	1930
Jan.	180.4	132.7	180.5	160.1
Feb.	198.0	123.6	197.0	196.4
Mar.	131.1	138.6	209.4	164.1
Apr.	130.0	107.7	172.6	122.8
May	134.8	335.6	177.7	92.7
June	138.4	149.1	177.3	102.1
July	89.9	94.8	219.3	90.6
Aug.	106.4	278.0	229.5	85.2
Sept.	80.4	170.0	216.3	91.0
Oct.	98.0	185.0	245.3	50.0
Nov.	95.8	197.8	128.6	45.3
Dec.	106.8	166.5	208.0	.....

Base: Average monthly shipments for 1922-23-24 taken as 100.

Coal Total Declines

Total production of soft coal during the week ended Dec. 13 is estimated at 8,780,000 net tons. Compared with the output in the preceding week, this shows a decrease of 827,000 tons, or 8.6 per cent. Production during the week in 1929 corresponding with that of Dec. 13 amounted to 11,805,000 net tons, according to the bureau of the mines.

Babbitt Production Gains

Total output of babbitt metal for sales in October by the 21 concerns which report their monthly sales to the bureau of the census was 1,962,156 pounds, compared with 1,730,269 pounds for September. Consumption by reporting concerns was slightly off, though the total of both at 2,988,914 pounds for the month exceeds September's 2,765,153 pounds, as the following monthly compilation shows:

	Total apparent consumption	Sold by manufacturers	Consumption by producers
	(Figures given in pounds)		
1929			
Oct...	5,518,851	4,007,260	1,511,591
(10 mos.)	57,269,335	44,558,912	12,710,423
Nov...	4,522,034	3,205,689	1,316,345
Dec...	3,343,492	2,394,159	949,333
Total (year)	65,134,861	50,158,760	14,976,101
1930			
Jan...	4,408,455	3,405,041	1,003,414
Feb...	3,426,576	2,525,771	900,805
March	5,051,575	4,039,395	1,012,180
April	3,868,408	2,838,877	1,029,531
May	3,932,501	3,003,298	929,203
June	3,702,989	2,546,606	1,146,383
July	2,907,977	2,022,058	885,919
Aug.	2,737,121	1,783,331	953,790
Sept.	2,765,153	1,730,269	1,034,884
Oct.	2,988,914	1,962,156	1,026,758
(10 mos.)	35,789,669	25,856,802	9,932,867

Enameled Shipments Higher

October shipments of sheet metal ware were 329,337 dozens in comparison with September shipments of 297,622 dozens. Shipments are in distinct recovery from September's low and are highest since April. Gains were shown in each color classification, figures for which were reported by 80 per cent of the industry to the department of commerce in the following:

In Dozens

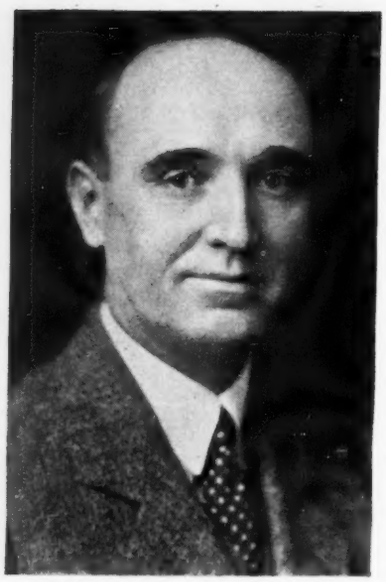
	Total	White	Grey and Colored
1929			
October	371,292	158,138	213,154
(10 mos.)	3,806,865	1,642,490	2,164,375
Nov.	305,714	115,117	190,597
Dec.	391,523	103,404	288,119
Total (year)	4,504,102	1,861,011	2,653,091
1930			
Jan.	332,146	110,758	221,388
Feb.	331,915	120,523	211,392
March	341,372	124,856	216,516
April	318,431	124,562	193,869
May	290,617	114,709	175,908
June	247,861	90,151	157,710
July	213,420	70,718	142,702
August	309,645	89,259	220,386
Sept.	297,622	97,262	200,360
Oct.	329,337	107,553	221,784
(10 mos.)	3,012,366	1,050,351	1,962,015

To Scrap 17 Submarines

Washington—The navy department has ordered the Philadelphia navy yard to proceed with the scrapping of 17 obsolete submarines. Salvaged material will be sold.

Industrial Men in the Day's News

D. A. Williams, New President, Continental Steel Corp.



DURING a business career of 35 years he has taken part in three mergers.

FALCON Iron & Nail went into the forerunner of American Sheet & Tin Plate; New Process Galvanizing was acquired by Youngstown Sheet & Tube; and Superior Sheet Steel merged into Continental.

ALWAYS identified with the operating end, he now becomes president where he has had charge of operations since July, 1927.

ACTIVELY engaged in several branches of the steel business for the past 35 years, D. A. Williams, who has been vice president in charge of operations of Continental Steel Corp., Kokomo, Ind., since July 1, 1927, early this week was elected president.

The appointment is effective Jan. 1, when he will succeed Henry A. Roemer, who as noted in STEEL of Dec. 4 becomes president of Sharon Steel Hoop Co., Sharon, Pa., and Youngstown, O., in succession to Severn P. Ker, its new chairman.

Mr. Williams, who has taken part in at least three mergers, began his business career in the operating department of the Falcon Iron & Nail Co., Niles, O., which later with Falcon Tin Plate & Sheet Co. went into American Tin Plate Co. which in turn became with other companies the American Sheet & Tin Plate Co., a subsidiary of the United States Steel Corp. The Niles plant has long since been dismantled.

His next connection was with the New Process Galvanizing Co., Niles, O., and when that company was acquired by the Youngstown Sheet & Tube Co., Youngstown, O., his second experience with a merger, Mr. Williams went along and remained until 1913. He then resigned to become affiliated with the Canton Sheet Steel Co., Canton, O., now a part of the Canton properties of Republic Steel Corp., Youngstown, O.

Leaving the Canton Sheet Steel Co. in 1919, Mr. Williams assisted Mr. Roemer in the formation of the Superior Sheet Steel Co., also of Canton, and was elected vice president and general manager. When on July 1, 1927, that company, Chapman-Price Steel Co. and Kokomo Steel & Wire Co. were merged to form the Continental Steel Corp., with headquarters at Kokomo, Mr. Williams' third merger, he was elected vice president in charge of operations and in that capacity he has served until this latest promotion which takes him to the chief executive's desk.

CLAXTON E. ALLEN, formerly manager of the southwestern district at St. Louis for Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been elected a commercial vice president. He will have headquarters at East Pittsburgh and report to W. S. Rugg, vice president in charge of sales.

Mr. Allen, associated with the Westinghouse company since 1909, is a native of Virginia. He was graduated with a B. S. degree in electrical engineering from the Virginia Polytechnic institute in 1901. His first position with Westinghouse was as head of the transformer division, detail and supply department. Three years later he was made assistant manager. For a short time in 1915 he was attached to the New York sales office and then was made manager of the supply and central station divisions, Chicago. In 1922 he was appointed St. Louis district manager. He is a fellow of the American Institute of Electrical Engineers and has been vice president of the St. Louis electrical board of trade.

□ □ □

William J. Davies, of Pittsburgh, has been appointed superintendent of the pipe fabricating shop of Murray W. Sales & Co., Detroit. He has had 25 years' experience in pipe fabrication in this country and in Russia. He has been in charge of pipe work in all plants east of the Mississippi river of the General Chemical Co.

□ □ □

Fred E. Lee, for many years president of the Beckwith Co., Dowagiac, Mich., is chairman of the combined Beckwith Co., and Round Oak Furnace Co. W. J. Fickinger is new president. Other officers are: Frank Arndt, vice president in charge of production; Bruce E. Gollan, sales manager; Rene Walker, secretary; and Harry L. Mosher, treasurer.

□ □ □

George H. Rupp has been appointed manager of the newly-created mining department, Colorado Fuel & Iron Co., Denver. He will have charge of all iron and coal mine and quarrying operations. Since 1929 he has been in charge of iron mines and quarries. He previously was with Calumet & Helca Consolidated Copper Co., Calumet, Mich.

□ □ □

E. Walcher has resigned as manager of operations of the eastern

division, General Steel Castings Corp., Eddystone, Pa.

H. E. Rogers has been promoted to works manager of the eastern division. He formerly was at the company's Granite City, Ill., works.

F. C. Henke, mechanical superintendent, and J. P. Begley, chief metallurgist, both of the eastern division at Eddystone, also have resigned.

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James H. Raymaker, Chicago, mechanical engineer, has been named general manager of the National Transit Pump & Machine Co., Oil City, Pa., effective Jan. 1.

□ □ □

Merritt P. Whipple, membership secretary of the Rochester, N. Y., chamber of commerce, has resigned to become president of the newly organized Lock-Rite Corp., Rochester, manufacturer of toys and other metal specialties.

Claxton E. Allen

Richard W. Orthwein, district representative at Memphis, Tenn., of the Granite City Steel Co., St. Louis, has been transferred to the Dallas, Tex., office, to succeed H. A. Hawkins, resigned. The Memphis office has been discontinued.

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James A. Hall, with headquarters at 1525 Esperson building, Houston, Tex., has been appointed district representative for Stewart Iron Works, Cincinnati.

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A. E. Shepard, for several years past factory manager for Sommer & Adams Co., Cleveland, milling machines, etc., has been appointed general manager for C. F. Laganke Co. Inc., Cleveland, special tools, dies, gages, etc. He also had 13 years experience in developing tire making machinery for the B. F. Goodrich Co., Akron, O., and for some time during the World war he was factory manager for Ideal Automatic Governor Co., Newark, N. J., manufacturing governors for submarines.

H. E. Henry, formerly identified with Tools & Gages Inc., Cleveland, has been placed in charge of sales for C. F. Laganke Co. Inc. He has had nearly 15 years experience in marketing as applied to machinery and tools.

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J. M. Bonner, who for several years was manager of Eljer-California Co., Los Angeles, has been appointed manager, Whiting-Mead Co., Los Angeles, which operates a foundry at 2260 East Vernon street, Los Angeles.

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Henry L. Zimmerman, formerly with Zimmerman Steel Co., Bettendorf, Iowa, Santa Fe railroad and the Bettendorf Co., Bettendorf, was recently appointed foundry engineer by Freyn Engineering Co., Chicago. He will be stationed at Kudentsk, Soviet Russia.

Obituaries

HOWARD R. CONNELL, 48, representative for 22 years of General Electric Co. at Allegheny Steel Co., Brackenbridge, Pa., died at his home in Tarentum, Pa., Dec. 3. He was a graduate of Syracuse university and joined the research department of the General Electric Co. in 1906, taking charge of the company's laboratory at the Allegheny Steel Co. in 1908.

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John Lally, president of Lally Column Co., Boston, died Dec. 4.

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Elmer J. Manning, 63, president of Manning Machine Works, Janesville, Wis., died recently.

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William S. Ingraham, 73, for 38 years treasurer and general manager of the E. Ingraham Co., Bristol, Conn., clock manufacturer, died Dec. 14.

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James T. Frank, for eight years metallurgical engineer in the steel foundry of Bethlehem Steel Co., Steelton, Pa., died Dec. 9 as a result of an automobile accident.

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William S. McKinney, 41, for many years identified with the Mckinney Mfg. Co., Pittsburgh, builders' hardware, died in that city Dec. 20 as the result of an automobile accident.

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Henry Alonzo House, 90, inventor, who was said to have built the first American steam automobile in 1866, died at Bridgeport, Conn., Dec. 18. He had taken out about 300 patents covering various machinery inventions.

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George H. Helvey, 78, who died at Hamilton, O., last week, was a director of Hooven, Owens, Rentschler Co., Hamilton. He was general manager of that interest for a number of years, being the accredited inventor of valves used on corliss engines.

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Michael A. Norton, who for ten years has been associated with Albany Brass Foundry Inc., Albany, N. Y., latterly as president, died Dec. 6 in that city. At one time Mr. Norton was president of Sweet & Doyle Foundry Co., Green Island, N. Y.

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Fred Graf, 40, for the past two years connected with the Milwaukee Foundry Equipment Co., Milwaukee, died recently. Formerly he was associated with the Commonwealth Steel Co., Granite City, Ill.; Southern Wheel Co., Pittsburgh; Frank D. Chase Inc., Chicago; and American Foundry Equipment Co., Mishawaka, Ind.

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Benjamin F. Guiney, 72, who died in Detroit, Dec. 5, was secretary to the president of Kelsey Wheel & Mfg. Co., Detroit, prior to his retirement two years ago. He had held that position for many years, having been purchasing agent for several years after the company was founded by John Kelsey. He also had served the Michigan Smelting & Refining Co., Detroit, in an executive capacity.

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Burton Wyman St. John, 59, president and general manager of Canadian Equipment Co. Ltd., Montreal, died Dec. 19. Although his earlier business career was spent in the United States and England, he located in Quebec when the Canadian Equipment Co. purchased the Locomotive & Machine Co. He was made vice president in 1919 and later acquired control and was elected president and general manager.

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Edmund Roebling, 76, last of four sons of the late John A. Roebling and at one time active in the management of the John A. Roebling's Sons Co., Trenton, N. J., wire and cable manufacturers, died Dec. 21, at his New York home. Upon his father's death in 1869 he, with his three brothers, assumed active charge of the company, but he was forced to retire after a few years due to ill health.

Propose New Fulton Iron Works Capital; Other Financial News of Steel Industry

STOCKHOLDERS and creditors committees of the Fulton Iron Works, St. Louis, have announced a plan of reorganization. The plan contemplates raising $230,000 additional working capital by issue of 5 per cent bonds; depositing $470,000 of general mortgage 5 per cent bonds against failure to liquidate contingent liabilities in three years; issuing $500,000 5-year serial notes in payment in full of general creditors; authorization of $230,000 general mortgage 5 per cent bonds to be held in the treasury as security.

Receivership has been temporarily stayed by the company by writ from the Missouri supreme court.

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Great Lakes Engineering Works, River Rouge, Mich., has declared extra dividend of 25 cents a share payable Dec. 22 to record Dec. 15.

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Newton Steel Co., Youngstown, O., has declared regular quarterly preferred dividend of $1.50, payable Jan. 31 to record Jan. 15.

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Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., has omitted the quarterly dividend of $1.75 on the preferred stock due at this time.

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American Shipbuilding Co., Cleveland, has declared regular quarterly dividends of $1.25 on common and $1.75 on preferred, both payable Feb. 1 to record Jan. 15.

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Moore Drop Forging Co., Springfield, Mass., reports net profit of $362,580 for fiscal year ended Oct. 31, against $1,050,674 in the preceding fiscal year.

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Union Metal Mfg. Co., Canton, O., has declared usual extra dividend of 25 cents and regular 50-cent quarterly dividend on the common, and regular quarterly $2 on preferred, all payable Jan. 1 to record Dec. 19.

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Columbian Vise & Mfg. Co., Cleveland, has declared extra dividend of 2 per cent in addition to regular semiannual disbursement of 3 per cent, both payable Jan. 2 to record Dec. 31.

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Pittsburgh Steel Foundry Co., Pittsburgh, has declared extra dividend of 12½ cents and regular quarterly of 25 cents, payable Jan. 15 to record Jan. 9. In previous quarter an extra of 25 cents was paid.

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Fostoria Pressed Steel Corp., Fostoria, O., has declared quarterly dividend of 25 cents on common stock, payable Dec. 31 to record Dec. 24. Corporation paid 50 cents quarterly previously.

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New York Air Brake Co., New York, has declared quarterly dividend of 60 cents a share, payable Feb. 1 to record Jan. 6. This compares with 90 cent quarterly dividends paid prior.

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Black & Decker Mfg. Co., Baltimore, has declared regular quarterly dividend of 50 cents a share on preferred stock. Quarterly common disbursement of 40 cents a share was omitted at this time.

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Link-Belt Co., Chicago, has declared quarterly dividend of 60 cents a share, payable March 1 to record Feb. 15. Quarterly dividends of 65 cents a share were paid on this issue from Sept. 1, 1929 to and including Dec. 1, 1930.

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Keystone Steel & Wire Co., Peoria, Ill., has declared regular quarterly preferred dividend of $1.75, payable Jan. 15 to record Dec. 31. No action was taken on the 25-cent common quarterly disbursement due at this time.

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Midland Steel Products Co., Cleveland, has declared regular quarterly dividend of $2 on 8 per cent cumulative first preferred; 50 cents on the $2 non-cumulative; and 75 cents on the common stock, all payable Jan. 1 to record Dec. 20.

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Budd Wheel Co., Philadelphia, has declared regular quarterly dividend of 25 cents on the common stock, payable Dec. 31 to record Dec. 22. Usual extra dividend of 75 cents and regular $1.75 on the participating preferred have been declared, both payable same dates.

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E. W. Bliss Co., Brooklyn, N. Y., has declared an extra dividend of 8 per cent on common stock, payable Jan. 2, April 1, July 1 and Oct. 1, to record Dec. 20, March 30, June 20 and Sept 20, respectively. Regular quarterly dividend of 25 cents a share was also declared.

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Judiciary committee of the Privy council, London, has decided that holders of common shares of the Steel Co. of Canada, are entitled to a share in all dividends of the company. The company carried its appeal to the Empire's highest court against decisions of the Canadian courts in favor of common shareholders.

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Niles-Bement-Pond Co., New York, has declared an extra dividend of 25 cents a share payable Dec.. 31 to record Dec. 20. This is in addition to regular quarterly dividend of 50 cents payable same date. Like amounts have been paid in each quarter this year.

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Eaton Axle & Spring Co., Cleveland, has declared quarterly dividend of 40 cents a share, payable Feb. 1 to record Jan. 15. Stock is placed on $1.60 annual basis, compared with a prior $3 rate maintained for the past two years. Earnings for 1930 are estimated at slightly over $2 a share.

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Pittsburgh Forging Co., Pittsburgh, has declared dividend of 25 cents, placing the stock on $1 annual basis, against $1.60 paid previously.

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Foote Brothers Gear & Machine Co., Chicago, has omitted quarterly dividends of 2 per cent in common on common stock and $1.75 on preferred due at this time.

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Cleveland Tractor Co., Cleveland, has declared a quarterly dividend of 20 cents a share, payable Jan. 15 to record Dec. 31. Former rate was $1.60 annually. For year ended Sept. 30, net of $670,370 equivalent to $3.04 a share was reported, against $970,128, or $4.41 the year before.

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Michigan Steel Corp., Detroit, stockholders of more than 85 per cent of outstanding shares voted Dec. 22 to accept the offer of the National Steel Corp., Pittsburgh, for purchase of the property and business of the Michigan corporation. Payment to the latter concern's stockholders is to be made on the basis of 50 per cent in 5 per cent 10-year gold debentures of National Steel, 25 per cent in cash and the remaining 25 per cent in cash or National Steel common shares.

Drawbacks Are Allowed

Washington — Treasury department has announced allowance of drawback on high speed steel manufactured by Latrobe Electric Steel Co., Latrobe, Pa., with use of imported tungsten ore, or concentrates, ferrotungsten and metallic tungsten.

The department has also announced drawback alowance on steel drums manufactured by National Enameling & Stamping Co. Inc., Milwaukee, at its plant at Laurel Hill, N. Y., with the use of imported steel sheets.

Damage claims for railroad freight decreased 44 per cent from 1920 to 1929.

Here and There in Industry

LUDLUM STEEL CO., Watervliet, N. Y., through H. G. Batcheller, recently elected president, discloses the fact that its Watervliet mill is undergoing extensive alterations to improve its facilities for production of the special steel introduced by this company in recent years.

Equipment for wire drawing, centerless grinding, heat treating, and other finishing operations is being enlarged and modernized and rolling facilities for special shapes are being extended to supply the demand for noncorrosive steel where other materials have previously been used.

The carrying out of this program will entail considerable concentration of tool steel production at the Dunkirk mill and some rearrangement of personnel at the various plants, but will permit of the concentration of equipment and supervision necessary for the development of both types of steel.

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Humble Welding & Specialty Works, Houston, Tex., is the new name for the Houston Iron Works, manufacturer of oil field supplies. H. Rodrigo is president and general manager.

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Pangborn Corp., Hagerstown, Md., will open district sales offices in Cincinnati and Milwaukee, Jan. 1. Thomas J. Dougherty has been appointed special sales engineer for the Hagerstown district, with headquarters in the home office.

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Taylor-Wharton Iron & Steel Co., High Ridge, N. J., has appointed Harry B. Shine, 2408 McKinney avenue, Houston, Tex., its warehouse representative in that district. Stocks of forgings for oil field and allied industries will be carried.

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Niagara Machine & Tool Works, Buffalo, manufacturer of sheet metalworking machinery, has opened a branch office at 3-217 General Motors building, Detroit, in charge of Russell J. Caplin, who has been with the company for 16 years.

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Moto Meter Gauge & Equipment Corp., Toledo, O., has discontinued all operations at Long Island City, N. Y., except a sales office, and has moved its general offices to Toledo. All activities are being concentrated at Toledo and LaCrosse, Wis. Facilities at both these plants are being expanded to replace those discontinued at Long Island City.

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Artisan Sheet Metal Corp., Rochester, N. Y., has been bought by Albert W. Jacobs, president of the Star Headlight Co., Rochester. The purchase includes the plant and business. Traffic signals will be manufactured in the plant, which has been closed for some time.

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Blair Strip Steel Co., New Castle, Pa., George D. Blair, president, will start production Jan. 1 after completion of a new fireproof main building replacing one destroyed by fire in October. The new building will house three 16-inch mills, the pickling department and electric generators for the entire plant.

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American MonoRail Co., Cleveland, manufacturer of overhead conveying equipment, has given to the Riley Engineering & Supply Co. Ltd., Toronto, Ont., exclusive rights in Canada for the manufacture and sale of its products. They will be marketed in Canada as Reco American MonoRail.

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Michigan Steel Tube Products Co., Detroit, Charles E. Miller president, has organized a subsidiary to be known as the Miller-Shelby Products division. It will have headquarters at Shelby, O., where a plant will be located to manufacture parts for aircraft, automobiles and tractors, motor car accessories and special rolled shapes for architectural purposes.

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Sterling Warner Corp. is being formed at Rochester, N. Y., by merger of the Sterling Range & Furnace Corp., Rochester, and the Fuller & Warren Co., Troy, N. Y. Manufacturing operations will be concentrated at Rochester, part of the equipment of the Troy plant being moved there. Stoves, ranges and furnaces will be produced.

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Corundite Refractories Inc., Massillon, O., has installed a tunnel kiln at its Massillon plant, for the production of miscellaneous shapes and sizes of special refractories. The kiln is 225 feet long and was designed by Robertson & Co., Cleveland. This unit will make possible quick delivery of special shapes.

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Aluminum Industries Inc., Cincinnati, has moved its branch at Los Angeles into new quarters at 1148 South Olive street. Facilities have been increased and the company's full line will be available from this center. Clyde C. Stonum has been transferred from the San Francisco office to Los Angeles as factory representative in Southern California.

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Globe Stainless Tube Co. has been organized by the Globe Steel Tubes Co., Milwaukee, with the same officers as the parent company. Sales will be handled through the same sales offices in principal cities. The new company will design and manufacture stainless steel tubes and tubular installations for corrosion and heat resisting purposes.

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Surface Combustion Co., Toledo, O., has contracted with Spang Chalfant & Co., Pittsburgh, to build a tube normalizing furnace, fired with natural gas in two stages. It also has taken a contract for a galvanizing furnace for Servel Inc., Evansville, Ind., and a furnace for normalizing, hardening and drawing for the Logan Gear Co., Toledo, O. The Mantel Recuperator division of this company has contracted to build a recuperator for the Youngstown Sheet & Tube Co., Youngstown, O., to be used with a 70-ton tube reheating furnace being installed by Surface Combustion Co. Furnace atmosphere is controlled by proportioning equipment and automatic draft control.

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Carnegie Steel Co. has placed a contract with the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., for motors and other electrical equipment for installation at its Duquesne Works, Pittsburgh. The contract includes a 1600-horsepower, 490-revolutions per minute induction motor, a 1250-horsepower, 600-volt, 60-120-revolutions per minute reversing motor and a 1250-kilowatt synchronous motor generator and switching equipment. The motors will be used to drive a 28-inch roughing mill and a 22-inch finishing mill, replacing steam drives, as part of a program of modernization. Operating economy of the bar department will be increased by electrification of drive of these mills, which are used for rolling round bars for automotive use.

Ferroalloys in 1929 Gain

Most of 1929's 858,519 tons of ferroalloys were produced for sale, 745,629 tons coming under this class and leaving 122,890 tons, or an approximate one-sixth, which were produced for consumption in other plants of the same companies.

The 1929 production was a gain of 678,324 tons over 1927 according to the bureau of the census. Both blast and electric furnace production of ferroalloys increased proportionately in 1929 over 1927.

EDITORIAL

1930 Reveals Steel Industry's Greatness and Weakness

THE year nineteen-thirty has almost run its course. Few will regret its passing and all will hail the new year for its promise of better times. The world is eager to put behind it the disappointments and despairs of 1930, longing for the future which it feels sure will bring prosperity. If the average business man were asked today for his sentiments in regard to the past year he would say: "I'm glad it is over," and if he were to be asked what he would remember it for he would reply: "A steady decline in business and profits."

If one were to keep his eyes fixed on the dark side of the 1930 ledger he would find enough there to discourage him; he would consider 1930 solely as a year of a major business depression. Yet many redeeming features are found on the other side of the record; industry in the United States was put to a severe test, and the manner in which it met that test will remain one of the brightest spots on the pages of business history.

Industry Has New Conception of Obligation to Employes

For the first time on record industry almost as a unit recognized and publicly declared its responsibility for the welfare of its employes. Leaders in the steel industry were among the first to announce they would not reduce wages, that they would give employment to as many employes as possible—that "the steel industry will take care of its own." Subsequent developments have proved the industry has adhered to that policy, and has exerted a stabilizing influence.

In doing so it has absorbed a loss of no less than a quarter billion dollars, on the volume of business actually transacted. This may easily be calculated from the fact steel prices are $6 a ton lower today than they were a year ago, and on the estimated ouput of 41,320,000 tons of steel for 1930 this item alone figures to $247,920,000. A drop of $2.25 per ton in the price of pig iron adds considerably to the loss. It is true the decrease was not precipitate; a reduction of $6 a ton did not apply to all the steel produced, nor did a drop of $2.25 apply to all the foundry pig iron made, but a good fair average of the loss through price reductions on raw and finished materials undoubtedly would exceed $200,000,000, not including the loss due to added cost of production, resulting from the employment of more labor per ton of iron and steel produced than at any other time in recent years.

Other industries suffering from the depression have been given far more consideration than has steel; the federal farm board, for instance, is encouraging a reduction in wheat production as a means of stabilizing price.

Unrestrained Competition Adds Little to Volume; Injures All

From a tonnage standpoint the steel industry in 1930 did not suffer nearly so much as during the depression ten years ago. Then steel output was reduced 53 per cent from the preceding year, whereas in 1930 the reduction in output was 27 per cent from that of 1929. The estimated production of steel ingots and castings—41,320,000 tons for 1930—is only 3 per cent below the average of the previous nine years.

On the bright side of the ledger also is the fact that demand has been pent up for future release. Stocks have been liquidated, and as normal requirements reassert themselves they will be translated immediately into larger orders. A year ago, for example, the automotive industry had a tremendous carry-over of cars; its situation was worse than it is today. While it is too much to expect the automotive industry to repeat its 1929 performance in 1931, conditions in the industry are distinctly better than they have been at any previous time in more than 12 months.

In some respects the steel industry in 1930 has shown more intelligent direction dealing with the labor problem than in merchandising. An industry large and powerful enough to take a firm stand against wage reductions was unable to safeguard itself against destructive competition within its own ranks. By every rule of reason it would have been just as fair and logical to have avoided an unreasonable sales policy as to place itself as a barrier against wage reductions.

Experience is an expensive teacher, and some times worth the cost. It has again shown more positively than ever before that nothing can be gained but much can be lost through a blind struggle for volume. The problem this time has received more earnest consideration, and while it has not been solved if the experience so forcibly impressed on the industry will lead to more rational merchandising that point can be put down as one of the redeeming features of 1930.

The Yearbook of Industry

WHEN industry is going through a difficult period, executives usually are deeply engrossed in the routine of immediate problems. Constant, daily struggle in the face of discouraging conditions tends to dull one's imagination. Too intimate contact with the details of the present is apt to blind one's vision of the future.

It is unfortunate that this situation exists at a time when the need of a broad perspective is more important than at any period in the last decade. Now more than when business is good it is desirable that the leaders of industry look above and beyond the limits of the current day's work.

The editors of STEEL have kept this fact uppermost in their minds in planning the Jan. 1 issue—*The Yearbook of Industry*. Throughout the contents of the more than 120 editorial pages will be found material designed to give the reader a true perspective of developments in every major department of the steel industry. Basicly the yearbook is analytical and interpretive, but the treatment is forward-looking rather than historical.

For instance, STEEL, as in past years, will present its annual figures on the distribution of finished rolled steel, but in addition it will indicate, from results of an investigation, the fields in which future consumption is likely to increase. Likewise it will present a study of the possibilities for the use of engineering equipment during the next few years.

Little attention has been given to the selling of steel. In many cases the only contact between steelmakers and their customers is through the steel salesmen. In the Jan. 1 issue STEEL will present an article based on an exhaustive study of the opinions of steel consumers on steel salesmanship. We believe this article will open up new opportunities for improving the relationship existing between the sellers and buyers of steel.

Realignments of physical properties in the industry are taking place every day, through merger, purchase or other action. The new line-ups, as they will appear when present ambitions are realized, will exert many new influences on the various units of the steel industry. What these developments will mean in future competition is discussed in an article of unusual importance at this time.

In spite of the seriously diminished income of industrial companies in 1930, the year has been marked by noteworthy progress in engineering. Certain achievements of the last 12-month period seem destined to play important roles in the production, fabrication and finishing of steel in 1931 and in following years. No maker or user of steel can afford to ignore the economies resulting from these developments, which are outlined in the "Engineering Progress" section of the *Yearbook*.

The Business Trend, exclusive feature of STEEL, is carried forward in the Jan. 1 issue with a number of unusual comparisons, revealing in graphic form certain facts regarding production, demand and prices that have not been emphasized heretofore.

These and numerous other features will make the 1931 *Yearbook of Industry* indispensible to those who wish to view industry in broad perspective. We hope it will prove to be a beneficial tonic—appropriate to an auspicious start of your business in the New Year.

STEEL

OLD ENOUGH TO KNOW THE GREAT TRADITIONS OF STEEL—
YOUNG ENOUGH TO LEAD THE INDUSTRY IN A MODERN AGE

THE BUSINESS TREND

Pulse of Industry Slows Down for Holidays

AS THE end of 1930 approaches there are no signs that an important change for better or worse is imminent. Frequently repeated disappointments of the past six months have placed business sentiment in a more patient mood. The average executive now is resigned to a long, hard climb back up to prosperity. Hopes that once existed—to the effect that the recuperative powers of the nation would miraculously combine to restore prosperity quickly—have long since been abandoned. Today the majority of business observers are looking forward to a gradual rather than a speedy recovery.

The year ends with business drifting listlessly. In the steel industry operations are down to 38 per cent of steelmaking capacity. The situation in the automobile industry is somewhat uncertain because the real market for new models will not be tested until after the first of the year. The automobile manufacturers are going slow, waiting for definite signs of demand. For the moment Chevrolet is operating at an encouraging rate; Ford is cutting down. The former's schedule for December calls for 61,000 cars while the Ford organization will make less than 30,000 units. The total output for cars and trucks for the United States and Canada for December is estimated at 125,000 to 130,000—not far from the November total. In December, 1929, the total was only 125,500 units.

Perhaps some consolation is to be derived from the possibility that motor car output in December may exceed that of that month last year. Of equal cheer is the announcement by General Motors that its sales to dealers in November, 1930, totaled 48,155 units compared with 39,745 in the eleventh month of 1929.

Predicts Slow Recovery for Automobile Industry for 1931

Speaking of the outlook in the automotive industry, Col. Leonard P. Ayres, vice president of the Cleveland Trust Co., told the members of the Cleveland Automobile Manufacturers and Dealers association that 1931 will be a reverse

The Barometer of Business

Industrial Indicators

	November 1930	October 1930	November 1929
Pig iron output (Daily average, tons)	62,180	69,851	106,289
Machine Tool Index	95.5	113.3	247
Unfilled Orders (tons)	3,639,636	3,481,763	4,125,345
Ingot output (Daily average, tons)	89,379	100,756	135,116
Dodge bldg. awards in 37 states (sq. ft.)	33,098,600	39,483,700	51,200,000
Automobile output	134,000*	154,585	225,000
Coal output, tons	38,122,000	44,337,000	45,500,000
Business failures; number	2,031	2,124	1,796
Business failures; liabilities	$55,260,730	$56,296,577	$52,045,000
Cement production, Bbls.	11,098,000	14,410,000	14,036,000
Cotton consumption, bales	414,887	444,494	540,150
Car loadings (weekly average)	825,427	954,446	978,000

*Estimated.

Commodity Prices

	November 1930	October 1930	November 1929	Monthly average 1913
STEEL's composite average of 14 iron and steel prices	$31.92	$32.26	$36.05	$26.32
Bradstreet's index	$9.84	$10.06	$12.40	100
Wheat, cash (bushel)	$0.97	$0.99	$1.20	92c
Corn, cash (bushel)	$0.90	$1.01	$0.90	51c
Petroleum, crude (bbl.)	$0.92	$1.08	$1.30	$2.50

Financial Indicators

	November 1930	October 1930	November 1929
25 Industrial stocks	$228.21	$242.95	$285.50
25 Rail stocks	$91.12	$97.95	$128.16
40 Bonds	$84.65	$86.34	$86.81
Bank clearings (000 omitted)	$34,756,941	$44,983,152	$63,842,000
Commercial paper rate N. Y. (per cent)	3	3	5½
*Commercial loans (000 omitted)	$8,774,000	$8,707,000	$9,743,000
Federal Reserve ratio, per cent	81.7	81.6	71
**Railroad earnings	$112,251,002	$104,078,334	$152,987,000
Stock sales, N. Y. stock exchange	51,949,840	65,497,479	72,455,420
Bond sales, par value	$187,205,700	$267,745,150	$290,680,000

*Leading member banks Federal Reserve System.

**October, September and October, respectively.

Foreign Trade

	November 1930	October 1930	November 1929
Exports	$289,000,000	$328,000,000	$442,282,000
Imports	$204,700,000	$248,000,000	$338,553,000
Gold exports	$5,008,000	$9,267,000	$30,289,000
Gold imports	$40,159,000	$35,635,000	$7,123,000

Foreign Exchange

	Normal	Nov. 1930	Oct. 1930	Nov. 1929
Sterling	$4.867	$4.86	$4.86	$4.87
Francs	3.918c	3.93c	3.92c	3.93c
Lira	5.260c	5.23c	5.23c	5.23c
Marks	23.830c	23.82c	23.78c	23.91c

of the conditions of 1930. The quarters of the new year, he said, will be in turn "terrible, bad, poor and fair." He predicted the first to feel a definite upturn will be the tire manufacturers. Colonel Ayres pointed to the fact the automobile industry has moved in cycles of three years—poor, better and record breaking. While he does not expect the cycle will be broken, he does not wish to predict new all-time records for 1932.

Car loadings, which partially reflect industrial activity, are following closely the trend of 1929, although at a lower level. Freight volume for the week ending Dec. 6 amounted to 787,173 cars, a gain of 85,088 over the week preceding, in which loadings were reduced by the Thanksgiving holiday. The gap between the 1929 and 1930 curves has narrowed slightly, due to a less precipitate decline in November this year than in the same month of 1929.

In view of the agitation now aroused in behalf of the railroads because of the encroachment of waterway, motor truck and interurban electric freight services, it would be interesting to scan reliable figures on the volume of freight that has been diverted from the steam railroads to these competitive agencies. If this volume were known, were converted in terms of car loads and added to the weekly car loadings, industry would have a truly remarkable measure of industrial activity.

Decline in Volume of Building Exceeds Rate of Normal Drop

Surveys of the building situation continue to be somewhat disappointing. It will be remembered that in October, the volume of awards fell off about 10 per cent against the experience of a slight increase in that month in normal years. November awards dipped below those of October to the extent of more than 10 per cent, which exceeds the normal loss for November by several per cent. The index of building permits compiled by S. W. Straus & Co. stood at 38 for November and 45.2 for October. The November figure is the lowest for any month of 1930. The general trend of the index, allowing for seasonal variations, has been downward since the mid-year in 1926.

Money rates still are at extremely low levels, but with increasing demand due to heavier trading in the year-end period, there has been a noticeable firming, particularly in call loans and in time money.

Trading on the New York stock exchange has been heavier during the past few weeks. Stock movement has increased somewhat and bond sales have been in decidedly greater volume. Security prices have declined still further. The average of industrials is at the lowest point since February, 1927, while the average for bonds is at the lowest point yet reached in 1930.

Apparently the new year will be here before anything definite is known about the price trend. Commodity prices still are fluctuating within a narrow range at recent low levels. Wholesale prices have dropped lower comparatively than retail prices, although the discrepancy today is less than it was in the early fall.

STEEL's composite price of 14 steel and iron products suffered a rather sharp drop last week when, as intimated earlier in these columns, weakness in semifinished steel carried the index down to $31.68, the lowest figure recorded since the composite has been computed. Barring unexpected complications, the fate of the composite now rests to a large extent on the behavior of bars, shapes and plates in the test of the announced 1.65c quotation.

◆ ◆ ◆

Climbing Out of the Hole

BY ALVAN T. SIMONDS

WHEN one gets down into a hole that seems to have no bottom and is attempting to climb out, the question is, "Is he moving upward?" No one believes he has fallen deeper into the hole if measurements prove that he has really moved upward. In discussing whether business has really climbed a little higher out of the hole into which it was dropped by business men and speculators in 1929, let us not broadcast the statement that it has fallen further down because its upward climb has not been so great as we believe it should have been.

This is exactly what has been done in the fall of 1930 by many business reviews and reviewers including some of the best known. For instance, business activity or any factor in business activity for any given week is charted as having *decreased* (even though in reality it *increased*) if its increase is not as great as the reviewer assumes it should have been. When business is at the bottom of a serious depression, general movement upward is what is most significant. It is the direction of the movement and not the amount of it that determines whether or not the bottom has been reached.

Adjusted Index Sometimes Is Misleading To Business Men

Indexes adjusted both for long-time trend and for seasonal trend are often misleading to one who is trying to find out just when the bottom of a depression has been reached. The statisticians' bottom is of course clearly evident. When the average business executive discovers that it is only a statistician's bottom and not the actual bottom of the depression, he is inclined to place upon it a well directed kick.

One of the leading business reviews in its issue of Oct. 17 published the scarehead "Business Index Dips Under the 1921 Low Point." In its chart of business activity, it showed the

From "Looking Ahead," a forecast published by Alvan T. Simonds, president, Simonds Saw & Steel Co., Fitchburg, Mass.

provisional index for September, 1930, as 78.3 and that of the low point of 1921 at 81.6. Many business executives to whom this statement was pointed out, when asked what they thought it meant, without exception stated that they understood it to mean that business activity or industrial production was actually lower in September, 1930, in volume than it had been at the lowest point in 1921. Of course this is not correct and this was never intended to be conveyed by the business review. One versed in

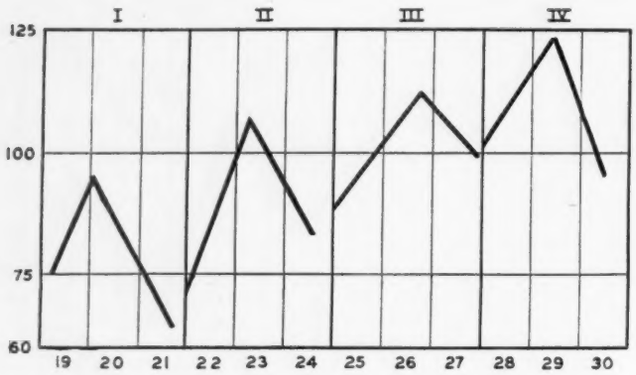


Chart I

statistical procedure or in fact almost any intelligent business man who read the article carefully and thoughtfully would realize that it could not mean this, but the majority of business executives do not thus read articles of this kind. The statement is distinctly made that the index is adjusted for long-time and seasonal trends. We believe it is a fact, however, that such charts, so adjusted, that have recently shown any business factor as declining in months in which it has actually made an advance over the previous month have been misleading and have helped increase the pessimism and discouragement that are always so prevalent and so unduly exaggerated when near the bottom of a depression.

Chart I shows the volume of industrial production as reported by the *Federal Reserve Bulletin,* using the monthly average volume for the years 1923, 1924 and 1925 as the base of 100 and the index for any month being the percentage that the production of that particular month is of this monthly average used as the base. This gives us for the low point in 1921 an index of 64 and for the low point so far reached in September 90½. This index is subject to revision, which is usually slight.

In Chart 2 we reproduce Chart 1 with one line added—a trend line running from the beginning of 1919 to the end of 1930. If the reader will look at Chart 2 by turning the page a little so as to get it before him just as he has been looking at Chart 1, he will see that this *trend line* runs *upward* from 1919 to 1930 and he can easily figure out that its upward slant indicates an increase in the volume of industrial production each year of 3 1/3 per cent or a total of 40 per cent in the 12 years shown on the chart. Now taking this *trend line* as a base of 100, by holding the page so that the *trend line* is horizontal, the reader can readily see how the "Climbing Cycles" of Chart 1 do not climb. All the climbing is in the trend line and this is charted as horizontal. He will also see how on the chart adjusted for long-time trend, the low reached in 1930 goes further below the base line than the low of 1927 or of 1924, and about as low as the low point in 1921. This kind of a

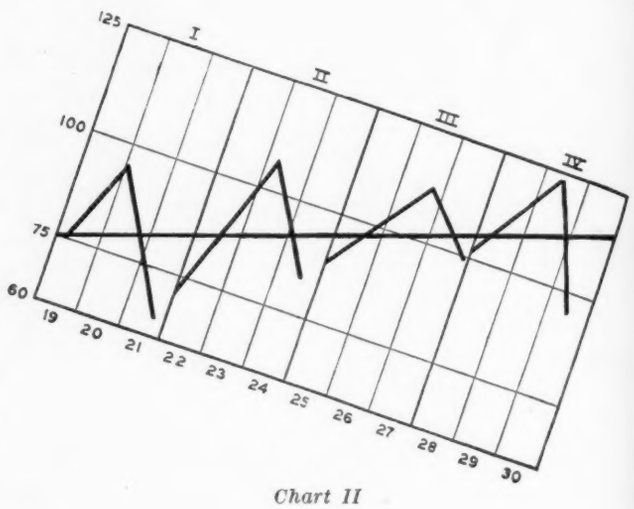


Chart II

chart is doubtless all right for those who are studying cyclical movements primarily, but when a business man is interested in getting a clear picture of the upward progress of business in the United States since the war and to discover just where business stands at any given time, the chart is likely to mislead him and often to discourage him.

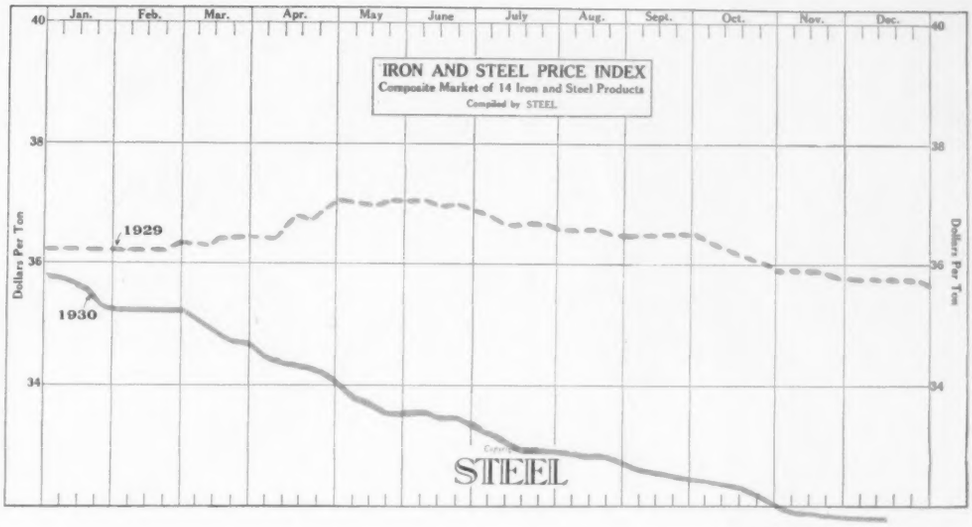
When a business man is told that at the low point in September the volume of industrial production in the United States was less than 10 per cent below the monthly average for the three years, 1923, 1924 and 1925, he feels that that is not so bad; but when he believes that at the low point in September, 1930, the volume of industrial production was less than it was at the lowest point in 1921, i. e. 36 per cent below the monthly average for 1923, 1924 and 1925, he thinks that is very, very bad and feels and acts accordingly.

Weekly Figures

Dec. 17	$31.68
Dec. 10	31.84
Dec. 3	31.84
Nov. 26	31.86
Nov. 19	31.86
Nov. 12	31.98

Monthly Averages

November	$31.92
October	32.26
September	32.65

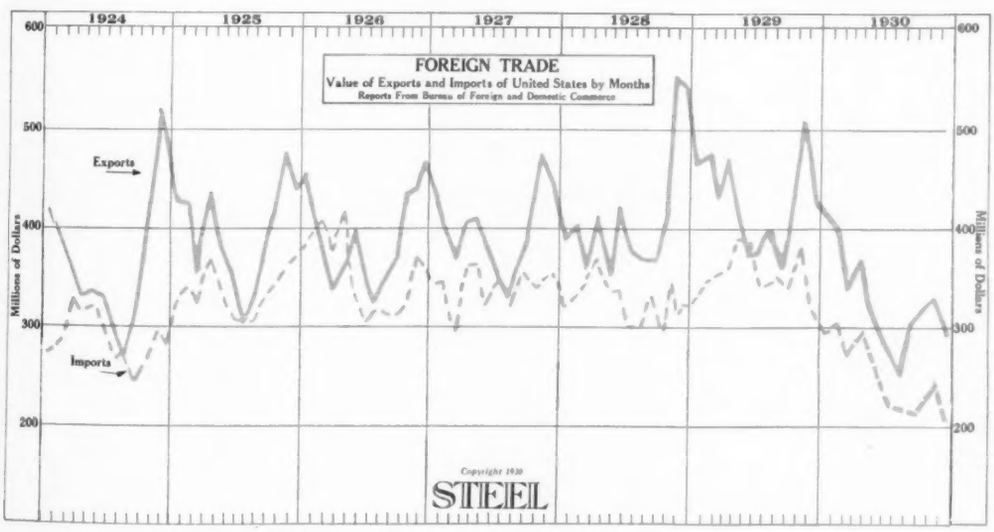


STEEL'S Composite of Prices Declines as Semifinished Steel Drops

Semifinished steel prices, in an adjustment which brings them in line with other iron and steel prices, dropped off $1 per ton during the week ended Dec. 17, and as a result STEEL's composite stands at $31.68, a loss of 16 cents from the previous week. Although this drop is the sharpest of recent weeks in the long steady decline, it was not entirely unexpected. As the new year enters a test will no doubt be made of the first-quarter price advances recently announced for certain items, and of stabilized prices in others. The price composite, which has repeatedly made new alltime lows, will thus tend to react upward until sales have determined the fate of the new quotations.

Foreign Trade of United States Suffers Relapse in November

Foreign trade in November slumped heavily after making a weak seasonal gain in the previous month. November imports were valued at $204,700,000 as compared with $247,324,000 in October and $338,472,000 in November, 1929; the dip reached the lowest point since October, 1921. Exports in November were valued at $289,000,000 as compared with $327,169,000 in October and $442,254,000 in November last year; with the exception of last July the figure is the lowest since February, 1922. The 1930 eleven-month total for exports, at $3,568,473,000, compares with $4,814,444,000 in the like period of 1929. Imports for 11 months of 1930 total $2,853,336,000.

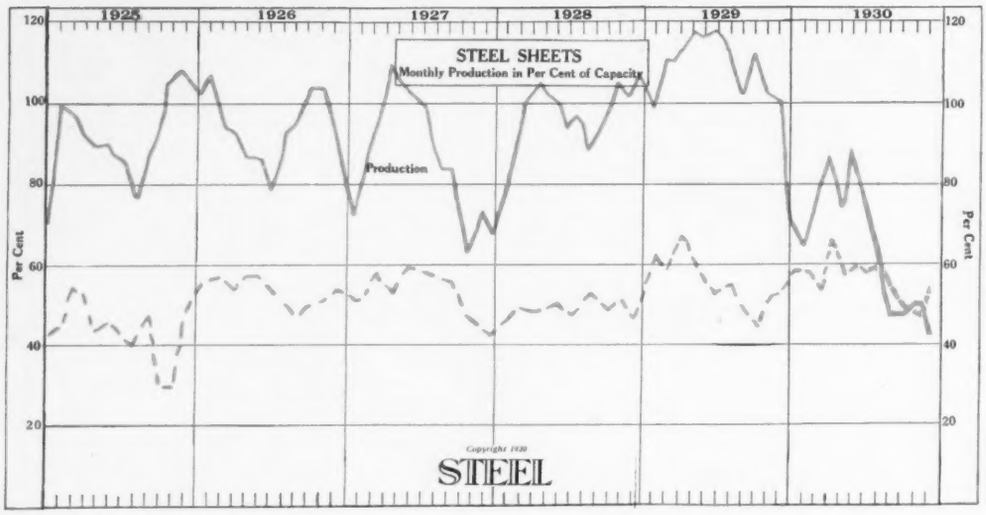


EXPORTS

November, 1930	$289,000,000
October, 1930	327,169,000
November, 1929	442,254,000

IMPORTS

November, 1930	$204,700,000
October, 1930	247,324,000
November, 1929	338,472,000



Production
Per cent of capacity

	1930	1929
November	43.6	65.8
October	50.6	95.3
September	48.8	97.7
August	48.6	109.7
July	50.4	98.1

Stocks
Per cent of capacity

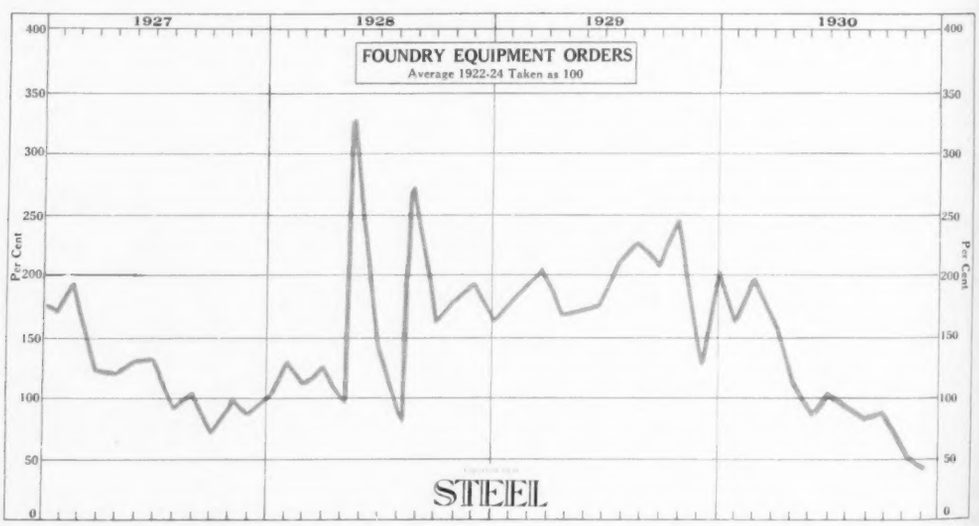
	1930	1929
November	54.1	57.6
October	49.4	50.5
September	50.4	50.1
August	50.9	42.9
July	54.9	46.9

Independent Sheet Steel Output Dips; Stocks and Unfilled Orders Rise

Sales, production and shipment of steel sheets by independent producers in November were lower than in the previous month, according to the figures compiled by the National Association of Flat Rolled Steel Manufacturers. Total sales amounted to 135,682 tons or 39.8 per cent of capacity, compared with 158,700 tons or 41.4 per cent in October. Production of 148,550 tons or 43.6 per cent of capacity compares with 193,934 tons or 50.6 per cent in the previous month. Stocks, which in October amounted to 49.4 per cent of capacity, mounted to 54.1 per cent in November. Unfilled orders increased from 83.4 to 86.6 per cent. Production was at the lowest rate of the present year.

Orders for Foundry Equipment Lower in November

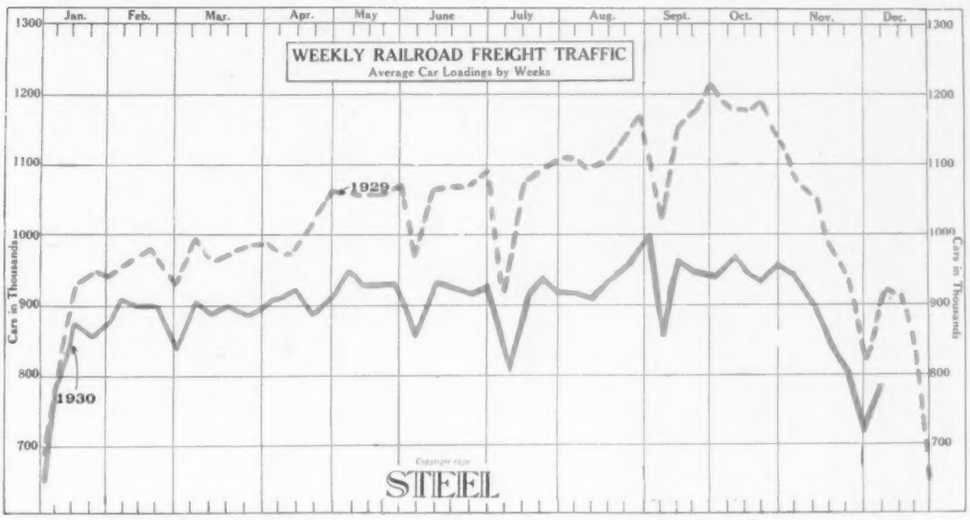
New orders for foundry equipment dropped again in November, when the index compiled by the Foundry Equipment Manufacturers' association dipped to 45.3. Bookings have fluctuated rather sharply throughout the year, making it difficult to detect a clear cut trend. Late in the summer the index turned upward for one month, but later dropped abruptly. In September the index again made a gain, this time of only 6 points, after which orders crashed from 91.0 to 50 in October. The erratic movement of the index reflects the low volume of new business and the sensitive response of the figures to a few sizable orders. The index figure has been halved since July.



Per Cent

	1930	1929
November	45.3	128.6
October	50.0	245.3
September	91.0	216.3
August	85.2	229.5
July	90.6	219.3
June	102.1	177.3

1930	
Dec. 6	787,173
Nov. 29	702,085
Nov. 22	779,757
Nov. 15	829,251
Nov. 8	881,401
Nov. 1	934,640
1929	
Dec. 6	936,825
Nov. 29	836,310
Nov. 22	949,716
Nov. 15	982,926
Nov. 8	1,048,968
Nov. 1	1,072,234

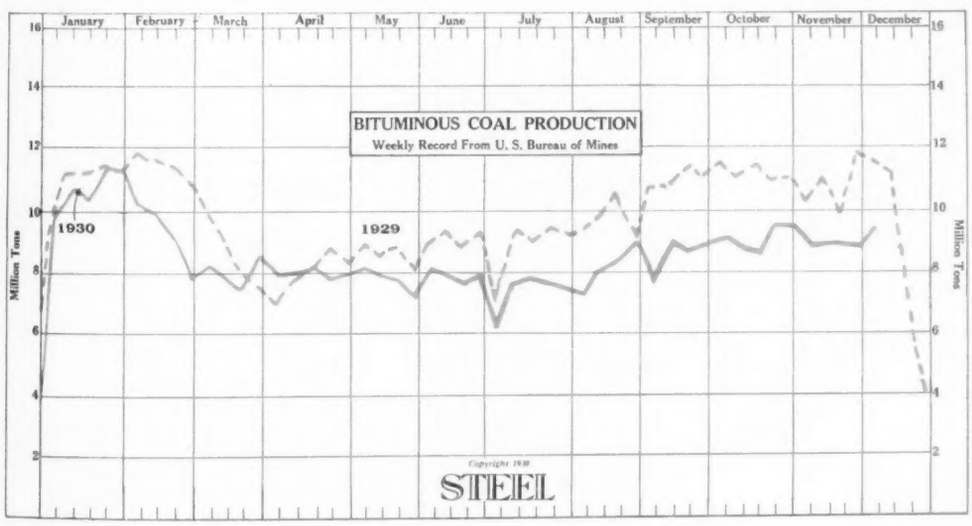


Car Loadings Show Gain, But at Disappointing Levels

The extent of the recovery from Thanksgiving week activity in freight car loadings is marked by a rise in the week ended Dec. 6 to 787,173 cars, as compared with 702,085 cars loaded during the holiday week. The increase, 85,088 cars, brings the total above the week ended Nov. 22 also, which was relatively low with only 779,757 cars loaded. Increases in all commodities were responsible. Comparisons with 1929 and 1928 figures still are unfavorable, however, as is indicated by the 1929 figure of 936,825 cars and the 1928 figure, 984,773 cars, both for the week ended Dec. 6. The comparative decreases are 146,138 cars and 197,600 cars, respectively.

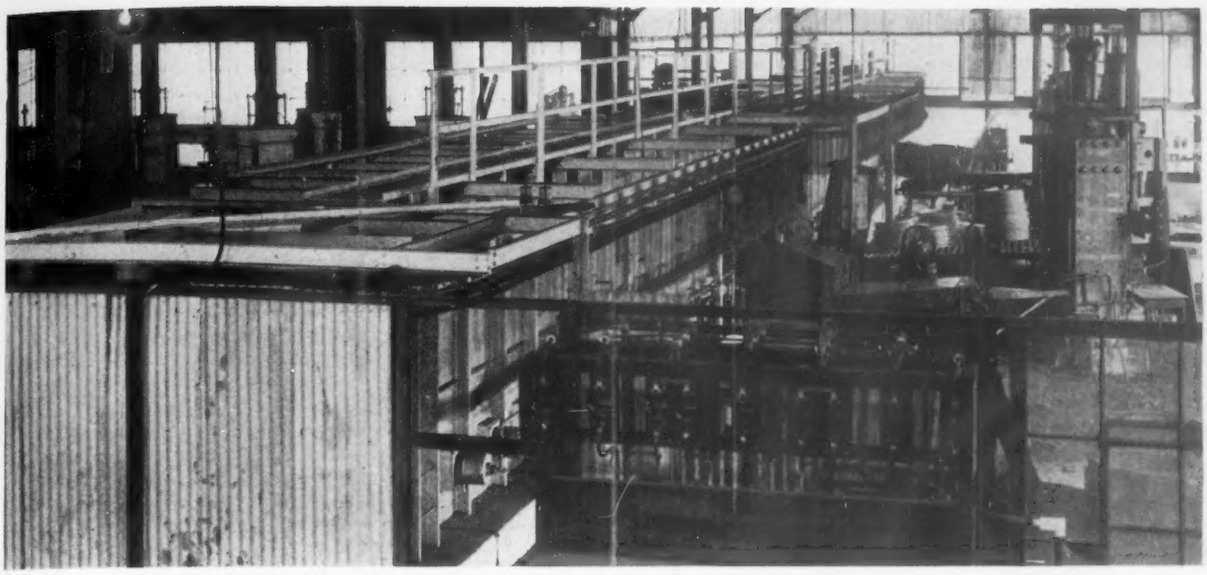
Output of Bituminous Coal Trails Behind 1929 Figures

A declining rate of activity during the first week of December took place in the bituminous coal industry, although weekly totals indicate a rise in tonnage. A total of 9,627,000 tons were produced in the week ended Dec. 6 and 8,705,000 in the week ended Nov. 29. The inclusion of the Thanksgiving holiday in the latter week accounts for the lower figure. In terms of daily rate the first December week suffered a decline. In 1929 an increase late in November and early in December brought production to a peak, shortly before the seasonal drop took effect at the end of the year. Total production of coal for the month of November was down to 38,122,000 tons.



Thousands of Tons		
	1930	1929
Dec. 6	9,627	11,942
Nov. 29	8,705	10,176
Nov. 22	8,890	11,173
Nov. 15	9,718	10,740
Nov. 8	9,708	11,285
Nov. 1	10,145	11,266

SPACED at close intervals these mechanical arms pass endlessly through the heating furnace, each supporting a large pipe coupling or flange, carrying it through the heated chamber and depositing it upon emerging at the other end. The gravity conveyor in the foreground transfers material from the press where a forming operation is performed to a position where it can be loaded easily onto another conveyor chain for subsequent heating in a second furnace.



General view of furnaces and presses. Forging or preheating furnace is in the rear

Heat Treating Pipe Line Couplings

Continuous Gas-Fired Forging and Reheating Furnaces Installed

BY C. B. PHILLIPS
Vice President, Surface Combustion Co.

RECENT awakening of the gas industry to the possibilities of transporting natural gas to more and more distant markets has been the cause within the past 2 or 3 years of a rapid expansion of pipe line systems of the country. Already these lines extend to 38 states and the present pipe line building program totals more than one quarter of a billion dollars. The energy from the natural gas consumed in the United States last year is estimated as equivalent to 527 billion kilowatt-hours, or almost six times the total production of electricity during the same period. The line from Texas to Chicago soon will be completed; a line already laid to Paterson, N. J., may be extended to New York; while another now supplying Philadelphia may be lengthened also for the New York service.

Many problems had to be solved before these longer lines could be built and one of these was that of stronger couplings, for the longer the lines, the higher the pressures required. The 1400-mile Chicago line, for instance, calls for working pressures up to 800 pounds. This problem was solved by S. R. Dresser Mfg. Co., Bradford, Pa., whose products already had solved the previous coupler problems of the industry. These couplings, consisting of a middle ring, two flanges, gaskets and bolts to hold the assembly together, have been in universal use in the oil and gas pipe line industry for many years. Already using the best steels obtainable, the company met the demand for couplings of greater strength by an ex-

On location, the Texas-Chicago gas line, showing pipe before connecting. Flanges, coupling rings and fastening bolts may be seen

tension to its plant with new and more powerful machinery at a cost of half a million dollars. Large furnaces, fired with natural gas fuel, continuous and automatic in operation, were installed and in connection with the plant expansion more lines of manufacture were added. These lines, like the others, are of the progressive, straightline production type and the furnaces were simply put in at the proper points.

Where hot forming was necessary, as in the case of the flanges, two furnaces are used in tandem, the first to bring the blanks to forging temperature and the second for reheating. These furnaces were designed and built by the Surface Combustion Co., Toledo, O.

In the new flange department plate steel is brought in on industrial cars to the blanking presses, blanks for the larger sizes being 32 inches in diameter and ½-inch thick. These blanks are charged into the loading end of the forging furnace and drop out automatically upon a gravity conveyor at the unloading end and are delivered hot to the forming presses. Two formings are necessary which requires two presses and the blanks are handled from one to the other by an operator with tongs. The blanks then are dropped into a gravity conveyor which takes them to the loading end of the heat treating furnace where another operator hangs them on to the conveyor. At the unloading end they automatically drop off into another gravity conveyor and pass successfully through a forming press, a quench and a bolt hole press.

The forging furnace is 42 feet long, 3½ feet wide and 4 feet high from the hearth to the flat arch. The side walls consist of approximately 9 inches of fire brick and 4½ inches of insulation while the suspended flat arch is constructed of special fireclay shapes and 6 inches of insulation. This flat arch carries, throughout its entire length, a narrow slot through which pass the alloy hooks suspended from the conveyor. The whole is encased in steel plates and the buckstays are carried to a sufficient height to give the proper support to the conveying mechanism.

This conveyor mechanism consists of an endless chain, operating in a water-cooled track, suspended just above the furnace, and carrying alloy hooks which project down into the furnace, through the slot in the arch. One line of the endless chain is directly over the slot in the furnace arch while the other line is away from the furnace so that the hooks travel back to the charging end entirely outside of the furnace. There is no loss of heat through this slot due to a series of short steel plates on the shanks of the hooks which form a continuous seal. The chain is stretched between two sprockets and the mechanism is driven by a motor through a speed reduction gear train.

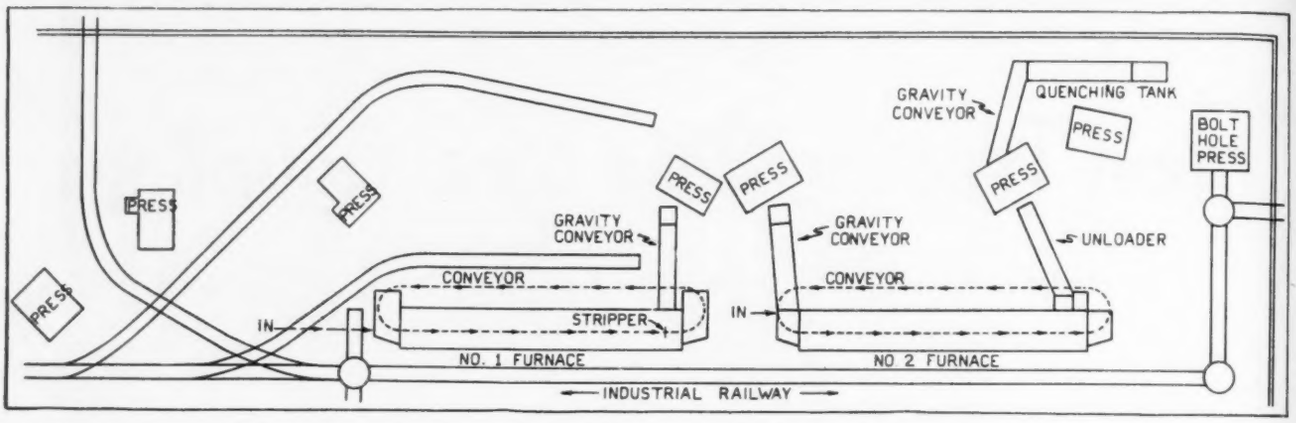
No Door Provided

Overall length of the conveyor is 66 feet, while the distance between the chain traveling over the furnace and the side moving exterior to the furnace is 6 feet. No door is provided at the entrance end as the opening here is made in the same size and shape as the blanks passing through. The fact that the blanks are quite close together and that this end of the furnace is designed for preheating only prevents the loss of much heat. When smaller size blanks are treated, the space is closed with specially-made steel forms.

At the other end, a side slot discharge is provided, a stationary stripper device causes the blanks to drop off the hooks, as they pass by, into a narrow inclined chute, down which they roll direct to the forming press. The operating mechanism is provided with a reversing device, so that in the event the forming presses stop for any reason, the entire charge can be run out of the furnace quickly before it is overheated.

Heating of this furnace is accomplished through the use of 26 wide-range velocity-type gas burners, firing below the hearth level in the heating zone. They are so arranged as to fire from both sides of the furnace and thereby provide uniform heating of the entire cross section. Gas is supplied at 25 pounds pressure, this pressure being built up in a compressor provided for the purpose.

Temperatures of the furnace are controlled by two automatic control pyrometers, supplied with recorders and connected with two mechanically-operated valves in the gas supply lines. The operating temperature is 1750 degrees Fahr. while the blanks are delivered to the presses at 1600 degrees Fahr. From the second press the partially completed flanges are returned to the charging end of the reheating furnace and placed on the hooks. These flanges enter the furnace already preheated for they still retain approximately 1200 degrees of the original heat.

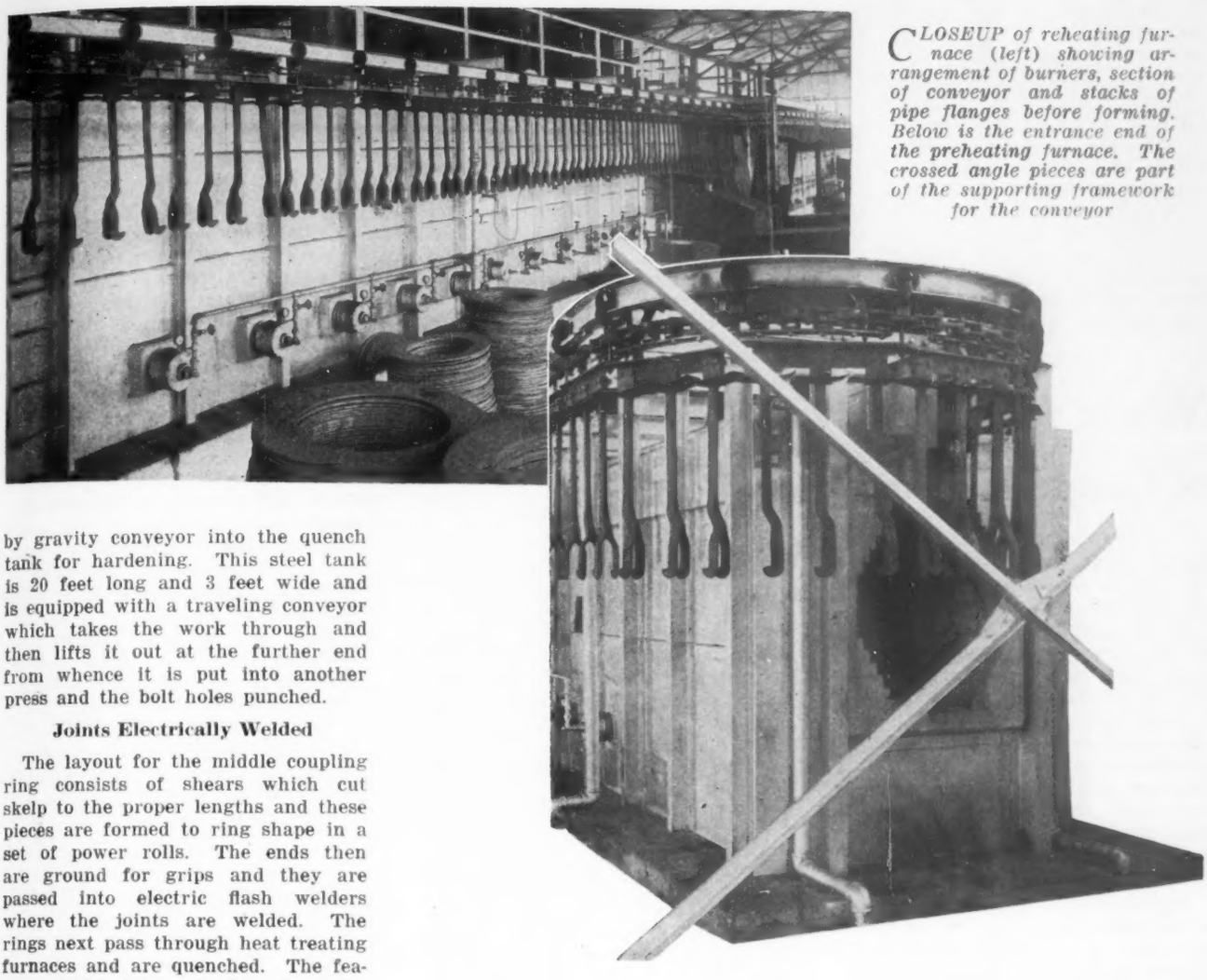


Diagrammatic sketch of plant showing arrangement of presses, furnaces and conveyors, and tracking system

The reheating furnace is similar in general to the forging furnace, the entrance being the same, also the unloading device and chute at the discharge end. The stripping mechanism is a special feature and serves to strip the hot semiformed couplings from the hooks and deliver them to the chute in the side discharge opening.

Burner equipment is the same except that the burners are distributed over the entire length of the furnace. The temperature required, in this case, is 1950 degrees Fahr., and is controlled as previously described. The steel disk that went through the first furnace has now been elongated to a maximum length of 3 inches on the flange. The maximum weight of each piece, disk or flange, is 67 pounds. Small disks, down to 15¾ inches in diameter and ¼-inch thick are also processed in this setup. The capacity of the unit is 18,000 net pounds of work or 268 pieces per hour.

Flanges are finished formed in a press close to the discharge end of the second furnace and from there they go



CLOSEUP of reheating furnace (left) showing arrangement of burners, section of conveyor and stacks of pipe flanges before forming. Below is the entrance end of the preheating furnace. The crossed angle pieces are part of the supporting framework for the conveyor

by gravity conveyor into the quench tank for hardening. This steel tank is 20 feet long and 3 feet wide and is equipped with a traveling conveyor which takes the work through and then lifts it out at the further end from whence it is put into another press and the bolt holes punched.

Joints Electrically Welded

The layout for the middle coupling ring consists of shears which cut skelp to the proper lengths and these pieces are formed to ring shape in a set of power rolls. The ends then are ground for grips and they are passed into electric flash welders where the joints are welded. The rings next pass through heat treating furnaces and are quenched. The feature of this layout is that, from the rolls on, the rings are delivered, or rolled from one process to the other along inclined runways. Even the furnaces are built long and narrow, with inclined hearths, so that the rings roll through without any mechanical aid and directly into the quench.

They are lifted out of the quench and put on to another series of runways that take them successively through the chipping department and three forming presses. Every ring is then subjected to an air pressure test. From the last press they are hung on an overhead traveling conveyor which takes them to the cars or to the storage. Periodically the parts for a complete coupling are taken directly from the lines, assembled and tested to 1600 pounds per square inch air pressure under water.

Farrel-Birmingham Co. Inc., Ansonia, Conn., has revised its group insurance for employes with the Metropolitan Life Insurance Co., New York. It is made co-operative and covers health and non-occupational accidents and has been extended to more than 900 employes on hourly-pay work.

Large Deposits, New Refining Methods Forecast Wider Use for Beryllium

BERYLLIUM deposits found in the pegmatite dykes of the Winnipeg river area, Canada, over 500 square miles in extent, are predicted by field engineers of the Beryllium Development Corp. of America to be some of the most important deposits yet discovered. The largest deposit in the United States is in the Black hills of South Dakota and it is from there that the corporation has obtained most of its supplies for experiment up to the present time. Despite all their investigations, the corporation's officers previously had discovered only one deposit of beryl in the mass and that was a very small one, but the first deposit investigated on the Winnipeg river trip was in mass in a dyke 15 feet wide, about 50 feet long, and of unkown depth. So far as known, this was the first massive beryl deposit ever found.

For some years beryllium has been produced in the laboratories of the world at a cost of over $200 a pound, but the research carried on in the corporation's various laboratories and in Germany have reached the stage where it is indicated that this metal will shortly be produced by electro-processes at under $5 a pound. The aim of the corporation is to popularize its use so that it will sell at around $3, thus following the cheapening course previously taken by aluminum.

Beryllium has been known for more than 100 years, but its valuable peculiarities have been put to use to a limited extent commercially because of the high cost of its production. If the cost is reduced, so that it will be available for all manufacturers who desire to use it, the problem will no longer be one of the laboratory production, but of the source of supply.

The metal is very light and is almost as hard as quartz. Its weight is less than that of aluminum. The de-

partment of mines, Washington, pointed out in a report issued last year that Siemens-Halke Co. of Germany has found that beryllium hardens iron to a great extent; by an addition of only 2 per cent the hardness is increased from 100 to 300. By means of heat treatment this hardness can be increased from 500 to 600 so that iron is hard as the "C" steels. Iron alloys with more than 4 per cent beryllium can be improved so that hardnesses are obtained only slightly below that of hardened steel.

It has been found that the resistance properties of alloys of copper and nickel are greatly increased by the addition of beryllium while an addition of beryllium to aluminum increases its strength and resistance to corrosion and a mixture of the two exhibits materially greater resistance to salt water and air corrosion than other light alloys. It is not generally known that the Beryllium corporation has also proved the metal to be malleable, contrary to a common belief, and that it has been rolled in the laboratory to a thinness of approximately 0.001-inch.

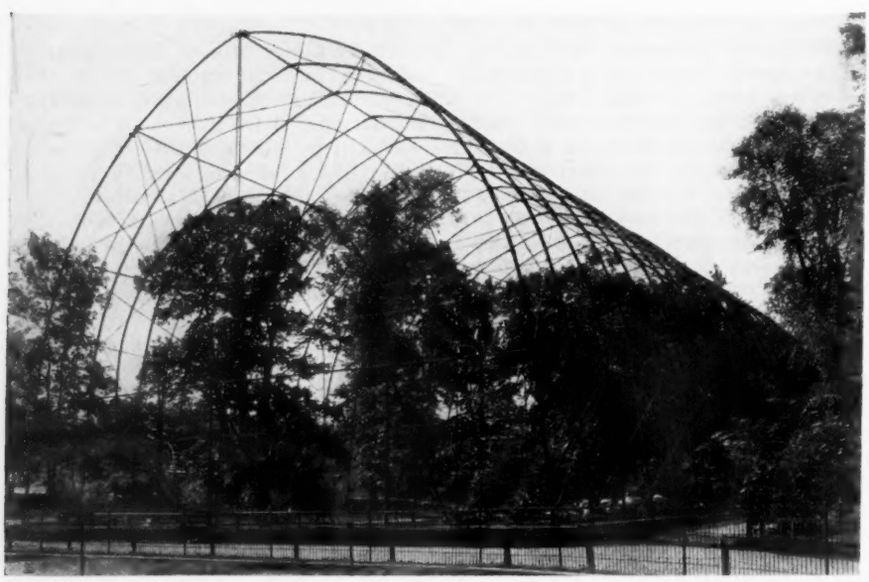
World's Largest Flying Cage Is Built of Copper-Bearing Steel Pipe

TO PROVIDE as much freedom as possible for captive birds from all over the world, the largest flying cage in the world has been built at the Bronx Zoological park, New York. This cage is constructed with a framework of copper-bearing steel pipe covered with 16,000 pounds of copper-clad steel-core 11-gage wire woven in a 2-inch chainlink mesh. The cage is 152 feet long, 71 feet wide and 50½ feet high. About 38,000 pounds of pipe containing 0.2 per cent copper and ranging from 3½ to 1-inch inside diameter was required.

The wire mesh covering has 24 per cent copper in its makeup or about 100 times as much of that metal by weight as the pipe. These materials will replace steel pipe and screen used in the former flying cage which was erected in 1898. Corrosion prompted its replacement. The fabrication and construction of the cage was handled by the Independent Fence Co., Brooklyn, N. Y. Cost of the structure is estimated at $20,000, and it is rivaled in size only by a cage in Buenos Aires, Argentina. H. De B. Parsons was the architect and he also designed the original cage which has been widely copied on a smaller scale throughout the world.

The steel framework is in a series of bays in form-arch construction, and rests on a concrete wall having an average depth of 4 feet. At bays, the wall is 6 feet 6 inches in depth. The entire frame is covered with fabric woven wire mesh with entrance spaces provided at the extreme ends.

Ninety-five per cent of the malleable fittings are made to meet the design, including the angles. The largest pipe is at the base, 3½ inches inside diameter, and as the cage rises, the pipe diameter is gradually reduced. Only in the smaller sizes are stock fittings being used. The 3½-inch pipe extends for the first 30 feet of the height. The pipe was made by the Youngstown Sheet & Tube Co., Youngstown, O., and the wire by the Copperweld Steel Co., Glassport, Pa.



Copper-bearing steel pipe and copper-covered steel wire were used to fabricate this flying cage which is the largest in the world

Waste May Be Converted Into Valuable Ore

Preliminary concentration tests on the black manganiferous iron ores of the Cuyuna district of Minnesota, conducted at the Mississippi Valley experiment station of the bureau of mines at Rolla, Mo., indicate that some of these ores may be beneficiated by ore dressing methods and that concentrates of commercial grade may be produced from what is now waste. The large tonnages of these ores available makes the matter one of considerable economic importance.

The association of manganese and iron is such that there is little possibility of producing concentrates sufficiently high in manganese and low in iron to be used in the manufacture of ferromanganese. The silica content of some of the ores can, however, be reduced to within commercial limits. On the cleaner ores this reduction can be accomplished by crushing to 8 or 10 mesh, classifying, tabling and concentrating the resulting fines by flotation. The more difficult ores must be ground finer to secure liberation. Tables may be used to recover some of the more granular material, leaving the fines to be treated by flotation, or the ore may be crushed directly to flotation size and an all-flotation process used. Both gravity concentration and flotation yield better recovery of manganese than of iron.

In the eyes of metallurgists accustomed to the more amenable sulphide ores the results obtained are not technically good; nevertheless, concentrates coming within the blast-furnace requirements have been obtained. Experimental work is being continued in an effort to find flotation reagents that will be capable of giving cleaner-cut separations than those so far used.

Open Research Building

Facilities provided by the recently opened Mineral Industries building, of Pennsylvania State College, State College, Pa., are described in bulletin No. 37 of the college entitled "An Industrial Need Fulfilled." The bulletin outlines the history of the departments housed, the program of research and instruction, and gives a short description of the building itself. The departments which will be housed in this building are ceramics, geology, petroleum and natural gas, metallurgy, mining, and the mineral industries experiment station and extension division.

Accident Cause Analysis Is Need in Metal Industry

BY W. GRAHAM COLE
Metropolitan Life Insurance Co.

BEFORE attempting to present an analysis of accident causes in the metal industry it would perhaps be advisable to discuss three particular phases of this subject as follows: First, what is the value of an accident analysis; second, what is an accident; and third, what is meant by the cause of an accident?

An actual knowledge of facts is efficient to the effective conduct of any business. This is as true with respect to the safety engineer as it is to the production manager, the works accountant or any other executive engaged in industry. Too frequently, in the past, however, those engaged in accident prevention work have failed to obtain the factual information necessary for the proper execution of their work; in other words, they have failed to approach their problem from the pure engineering viewpoint. To be sure, a great deal of engineering has been utilized in safety work, in the design of guards and the revision of plant processes. On the other hand, the cases have been rare when a safety engineer has given the same amount of engineering study to the survey of conditions and to technical research which an individual of other fields of work would give to the problems confronting him.

Safeguards Unsafe Conditions

The safety engineer, in approaching the problem of reducing accidents in a given industry, proceeds without analytical study. He safeguards any apparent unsafe condition in sight and undertakes a broad educational campaign. Although such measures are essential and have produced excellent results, better results undoubtedly would be obtained if the safety engineer knew in advance just what types of accidents were being encountered, what particular machines were in reality accident producers and then took definite steps to remedy and overcome conditions and hazards which this study indicated actually existed.

Furthermore, if the safety engineer made a careful study of the employes engaged in the work under consideration he would likely find that a small percentage of these workers are responsible for a large percentage of the accidents; that this accident proneness was not spasmodic but continued year in and year out with the same employes, unless steps were taken to correct it. He would also find that the employes involved in personal injuries were involved in many more accidents affecting the efficient operation of the property.

Intensive Effort Necessary

With knowledge of this sort the safety engineer would be in a position to develop intensive efforts among the high-accident employes in place of wasting efforts upon those employes who can work year in and year out without injury. By studying the characteristics of the high-accident employes he would be able to determine definite measures for aiding these employes to overcome their accident prone habits and characteristics and he would also be in a position to recognize the signs of such habits developing in other employes. In making an analysis or study of accident conditions it is essential that those facts be determined that can be utilized in the further prevention of accidents.

The next important phase of the subject concerned is a question of "What is an accident?" The Travelers Insurance Co., after an intensive study of thousands of accident records has estimated that for one major injury occurring in industry, 29 minor injuries and 300 accidents occurred which do not in any way involve personal injury.

In industrial safety work efforts usually are confined to the prevention of personal injuries and frequently only to the prevention of serious personal injuries and fatalities. It has been estimated that the costs of personal injuries to industry are five times the expense incident to carrying compensation insurance or to paying claims and medical expenses. Such an estimate, however, is confined entirely to the incidental cost of personal injuries but does not include the enormous cost of innumerable accidents which fortunately result in no injury to the human being.

A pair of engine frames weighing 7 tons recently was delivered into a division machine shop of a large western railroad to receive some additional machine work before being sent to the erecting shop. The foreman responsible for the unloading of material instructed two men to unload the frames from a flat car. It happened that these employes had no previous experience in handling material larger than small motors. Their foreman failed either to instruct or supervise their work.

Accidents Increase Cost

A 10-ton crane was available for removing the frames and the cables which were used for slings recently had been tested. Not being acquainted with this type of work, the workmen placed the rigging on the engine frame in an improper manner causing an unusual strain on the sling just as the load had reached its destination. The sharp edge of the engine frame cut through the cable at the point of extreme strain, dropping one end of the frame to the floor and causing additional tension which resulted in the entire cable snapping, uncoiling and falling in a heap on top of the broken frames.

Some 600 men were engaged at work in the shop at the time the incident occurred and quite naturally all stopped work to see what had happened. Perhaps it is a conservative estimate to say that each man returned to his work in 10 minutes. This delay, brief as it was, caused a loss of 100 nonproductive working hours for which, of course, the company had to pay.

About 250 men were working on the aisle which was fed by the incapacitated crane. These men were required to remove by hand or hand-truck all the material on which they were working for the balance of the day. This condition seriously decreased the efficiency of the group and delayed

THOROUGH analysis of basic causes of accidents is imperative if accident prevention is to be successful. Mere institution of an educational campaign and elimination of hazards will not suffice for the best results, in the opinion of the author of the accompanying article, abstracted from a paper presented before the metal section of the National Safety congress during the recent annual meeting in Pittsburgh. W. Graham Cole is director of safety service, policyholders service bureau, Metropolitan Life Insurance Co., New York.

production. A foreman and crew of men spent an entire day repairing the crane which also required repair parts and a new cable. The engine frames were shipped back to the division shop for recasting. Considerable time was spent by the chief engineer, division superintendent, foreman and others investigating the cause of the incident. The total cost to the railroad company due to the improper supervision of this particular job was, as the above figures indicate, enormous. Surprising as it may seem, however, the incident was not an accident according to the usual interpretation and in accordance with the reporting requirements of the Interstate Commerce commission because, quite surprisingly, no one was injured.

Broader Definition Needed

To obtain a true picture of the accidents in the metal industry, therefore, would it not be advisable to define accidents in a much broader manner than is customary and to state perhaps that an accident is an incident which causes damage to machinery, spoilage of raw or finished products, injury to tools and equipment, decrease in operating efficiency and/or personal injury to employes? If industry generally would accept such a definition of accidents greater attention would be given to accident prevention not alone as a means of preventing human suffering and decreasing insurance cost but as an outstanding method of improving the efficiency of the entire organization.

What is meant by "Cause of an accident?" To analyze accidents thoroughly requires a careful study not alone of the apparent cause or what is usually the apparent result of an accident but also all the underlying facts and trends of circumstances which actually make the accident possible. J. A. Kuchefmeister, Dominion Forge & Stamping Co. Ltd., Walkerville, Ont., speaking before the Mid Western Safety council last March gave the following interesting summary of accident causes:

	Per cent
Disorderly condition	50
Improper equipment	21
Improper materials	9
Improper construction	15
Lack of supervision	5
Total	100

All these contributing facts mentioned by Mr. Kuchefmeister have an important influence on accident causation. In some accidents they may be the basic causes. In many more incidents, however, they are in reality the result of conditions which could well be prevented if other facts were taken into consideration.

Such thorough analysis of basic causes are impossible at the present time for the metal industry, or in fact for any industry and will never be possible until a sufficient number of industrial safety engineers realizes the importance of analyzing their own compilations and of comparing results with others. At present from the standpoint of the industry as a whole we have to be satisfied with such information as is available. Referring to the latest report entitled "Statistics of Industrial Accidents in the United States," prepared by the department of labor, a table is presented showing the accident frequency rates of a selected group of iron and steel plants for a 15-year period given by year and cause. A number of accident causes are listed which, although not basic causes, present some idea of the typical types of accidents encountered in the metal industry. It is most gratifying to note from this table that in the 15 years covered the accident frequency rate has reduced 91.2 per cent. The reductions in the various types of accidents were as follows:

	Per cent
Working machinery	86.8
Operating cranes	77.3
Vehicles	87.1
Hot substances	92.8
Falls of persons	84.6
Falling material	99.9
Handling material	92.4
Miscellaneous	95.4

Such reductions certainly indicate that intensive and aggressive work has been conducted by the industry but the very size of this percentage of reductions shows that even more intensive and aggressive work is essential if further reductions are to be expected. It is reasonable to predict that this further intensive work will of necessity be developed only if undertaken as a result of an actual knowledge of basic causes of the few remaining personal injuries and of those accidents which have been recorded because no injury resulted.

In such intensive study it undoubtedly will be found that improved equipment, more effective safeguards, better operating processes and housekeeping methods still demand consideration. It will also be found that improved supervision will be required. In addition, however, the need for studying the individual employe and his physical condition, his instruction and training, his mental habits and characteristics, his attitude and environment will be controlling factors in the development of an operating force which is not only free from practically every personal injury but is also capable of reducing to a minimum that large percentage of nonpersonal injury accidents which form one of the greatest sources of inefficiency in operation and increase in the cost of production.

Diversity of Advice Clouds Problem of Polishing Stainless Steel

BY F. W. STURDEVANT

OF THE many articles appearing in various trade and technical journals dealing with the polishing of stainless steel, one is sometimes confused by the apparent diversity of the advice given, which in some instances appears to be contradictory. No doubt this is due in some measure to the lack of standardized definitions in the metal finishing trades. This misunderstanding of the terminology used probably has much to do with the failure to obtain the desired results.

Granting, however, one is set right on the proper equipment of tools, abrasives, speeds, etc., it is well to bear in mind that the process of obtaining a mirror finish on stainless steel is not easily or quickly accomplished, as compared with obtaining the same finish on the ordinary ferrous or nonferrous metals. Much depends on the original surface of the metal. A smooth surface is desirable; permitting, as it does, the use of finer abrasives in removing all pits and imperfections. This latter is absolutely essential to the obtaining of a fine finish, and also reduces the number of subsequent operations in removing wheel marks previous to buffing.

Much improvement is noted in the surfaces of sheets received from the mill, and more is hoped for by the trade. Small, stamped, spun, or drawn articles presenting smooth surfaces are readily buffed by the use of a fine-count cotton buffing wheel operated at a peripheral speed of 10,000 to 15,000 feet, cutting down with special composition made for this purpose, and coloring with chromium oxide. It is customary in buffing these parts, to mount both the cutting and coloring buffs on one spindle, thus enabling the operator to finish the part at one handling. Much has been said about the importance of the amount of pressure to be used in polishing stainless steel, and it is a factor with which to reckon. The amount of pressure to be applied can only be determined by experiment on a given stock, and should be variable with the different grades of grits and cuts taken on the work in process.

One writer has stated that the correct abrasive to use should conform in

hardness to a degree midway between aluminum oxide and silicon carbide. Others recommend the use of aluminum oxide for the first or roughing cut, and follow with a good grade of Turkish emery. Whatever abrasive is used should be absolutely uniform, free from slivers, flats, etc. Tallow or lard oil should be used on the wheels with each operation of polishing.

A 14-inch diameter soft muslin wheel, running at 1750 revolutions per minute, headed with a suitable grit, is the accepted type of wheel used for preparing the surfaces to be buffed. In finishing wide sheets of stainless steel or rustless iron, as many as seven or eight operations are required to obtain a relative mirror finish. On narrow strips ranging from one to six inches wide, and articles similar to auto radiator shells, the number of operations can be reduced considerably.

The sequence of grits used on wide sheets of certain makes of stainless steel are Nos. 80, 120, 150, and 180. The sheets are then brushed with a Tampico wheel, with No. 200 emery cake applied locally; then buffed with any of the fast cutting compositions made for this work, and finally colored with chromium oxide.

The cutlery trades finish large quantities of stainless steel knives and forks, and have a well defined process. The blades after being ground are passed between two polishing wheels of the compress type, which for this work have a flexible cushion, and covers the width of the blade. These wheels are mounted on a double-head polishing machine which polishes both sides of the blade at one draw. Usually two cuts are necessary before the blade is buffed.

This latter operation is now being done on a so-called mirror finishing machine. In this machine the blade is passed lengthwise with a sweeping motion over a cotton buff wheel charged locally with composition. This machine is entirely automatic in its operation, and was especially designed for this purpose. After all wheel marks are removed, the blade is highly colored by hand on a coloring wheel. The use of these machines has reduced the cost of stainless cutlery until the use of this popular metal for domestic purposes is practically universal.

Iron and Steel Engineers To Meet in Cleveland

The twenty-seventh annual meeting of the Association of Iron and Steel Electrical Engineers is to be held at Public Auditorium, Cleveland, June 15-19, 1931. Technical sessions of the meeting are to include papers on various vital steel mill subjects, while the exposition will present exhibits by manufacturers of steel mill equipment.

Iron Church of Manila Is Fabricated Completely from Wrought Plates

MANILA, capital city of the Philippines, boasts of the only church in the world built throughout of iron. Erected in 1891 by the barefooted Augustinian Friars, known as the Recollect Fathers, on the site of a chapel founded by that order in 1622 and later destroyed by earthquake, the church presents a fine example of stern Gothic architecture with its slender spires and sweeping vertical lines, discernible in the accompanying illustration. A description of this interesting structure appeared in an issue of the *Pure Iron Era*, published by the Armco International Corp., Middletown, O.

Built in Sections

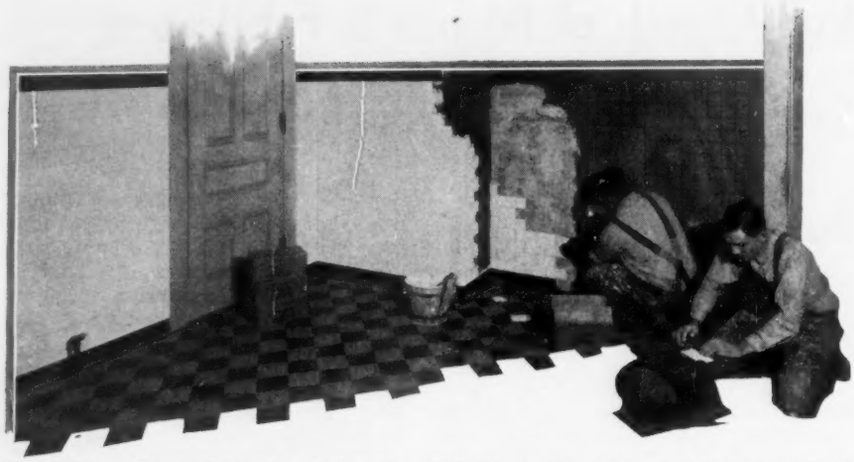
The whole building above the foundations was manufactured in sections by the Belgian Society of Public Works (Societe Anonyme d'Enterprises de Travaux Publiques) of Brussels, from the design of Mons. J. Bazain. Total floor space covered by the church is 7690 square feet and the twin spires mount to a height of 170 feet. The truss framework of the walls is faced with iron plates, both inside and out, spaced 9.6 feet apart and filled with cement, clay and sand as insulation against outside heat. The wallplates are held out from the cross beams by wedges which prevent warping and vibration.

Iron plates used in the construction are described as No. 3 Belgian iron. For exterior sheathing 795 tons was used and for interior sheathing 300 tons, excluding 19 tons of galvanized iron for roofing of spires and dome. Recently specimen plates of this iron were cut from the ceiling and shipped to the United States for analysis. They proved to be puddled wrought iron of high purity, the average analysis being as follows:

	Per cent
Carbon	0.010
Manganese	0.020
Sulphur	0.035
Silicon	0.066
Phosphorus	0.088
Copper	0.016

Determination of the Recollect Fathers to construct an iron church resulted from the fact that previously they had lost three churches built of stone and brick, through earthquakes; the fathers wanted a church which would withstand the climate, earthquakes and fire, and thus conceived the idea of iron walls.

Twelve stained glass windows and four rose windows illumine the interior which is strikingly impressive with its tall fluted columns—likewise made of iron—and Gothic arches groined and fanribbed at the top, a fine cupola rising in the center, decorated with frescoes of Carmelite saints.



Illustrating the method of applying the steel tile to the grooved foundation sheet to which cement has been applied. The workman in the foreground is using a portable type of metal saw for shaping the pieces of tile to odd sizes

Enameled Steel Tile Easily Applied to Old Surfaces

DURING the past 30 years the art of applying vitreous porcelain enamel to steel has made rapid strides. On account of its greatly increased physical properties, cleanliness, pleasing appearance and freedom from checking or cracking the material finds wide application in the manufacture of kitchen sinks, refrigerators, kitchen cabinets and other equipment. Not being handicapped by factors that apply to the older material, advantage was taken of the opportunity to simplify the method of application and thus lower the cost and increase the availability.

Special Foundation Sheet

A wall tiling recently developed by the Porcelain Tile Co., Chicago, employs the principle of a grooved foundation sheet into which the flanges of the enameled steel tile fit and are self-locating. The foundation sheet is applied to the wall structure according to specifications for both old and new construction. The grooves in the sheet then are filled with a special water-proof cement and the individual tiles installed. The cement that is displaced when the flanges of the tile are pressed into the grooves fills the joints between the tiles. By this method, ceramic-surfaced tile of high-physical properties and of identical appearance with clay material becomes available wherever a carpenter is available to install the foundation sheet.

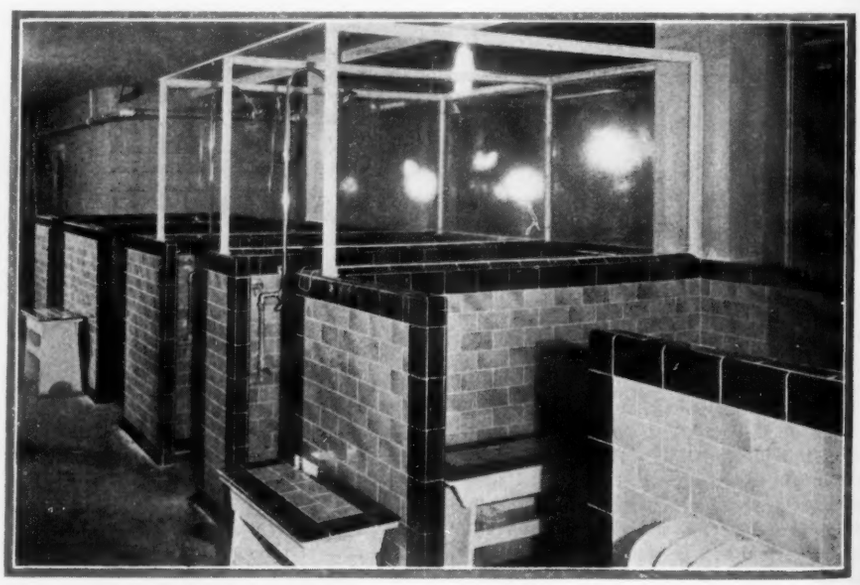
The metal tile is made of 24-gage sheet steel of enameling grade in sizes 3 x 3, 3 x 6 and 4½ x 4½ inches. The grooved foundation into which the standard sizes fit is made of a substance called "new wood."

The manufacture of these tiles as developed by the Vitreous Enameling Co., Cleveland, for the Porcelain Tile Co., is a standard, forming, cleaning and enameling procedure, the most essential factor being the thorough cleaning of the steel before coating with enamel. Strips are blanked from sheets and fed into presses which form the flanged edges of the tile and cut to size. A slight draw is taken and the flange width is about ¼-inch. The formed pieces are stacked in boxes and carried through a careful pickling treatment consisting of acid dips, washes, alkali dips and further washes. They then are moved through a drier and are ready to receive the ground coat of enamel, free from oxide, scale, dirt, grease or any other substance which might prevent perfect adhesion of the coating material.

The vitreous enamel is prepared by charging the silica and other ingredients into a gas-fired furnace, a temperature of about 2400 degrees Fahr. being maintained. When the materials are molten and a thorough mixture is obtained, the furnace is tapped and the molten material drawn off into a tank of water. The sudden cooling breaks the glassy product into fine granular pieces known as frit which is taken to a ball mill, mixed with the desired color and ground to a powder. By mixing with a slight amount of water, the enamel is made suitable for spraying on steel.

Enamel Applied by Spraying

The tiles are conveyed to spray booths in racks and a ground coat of enamel is applied, after which the pieces are conveyed slowly through a long drier, heated by several gas burners. When perfectly dry they are placed on large racks which are placed on rails and slid into the baking oven. The baking or burning temperature is about 1700 degrees Fahr. and the pieces are allowed to remain at that heat for about 2 minutes. After cooling, the color coat of enamel is applied and the same treatments of drying and burning are carried out. Often several color coats are applied, depending upon the coating thickness desired upon the finished part. The burning



Stalls in the shower room of a large hotel, finished in two colors of enameled steel tile, presenting a bright and clean appearance

furnaces are of the oil-fired muffle type and arranged with frames at the front to permit removal of a rack of burned parts and receiving another rack of material to be charged into the furnace.

Statistics of the department of commerce show that in 1928 and 1929, approximately 60 million feet of clay tile was manufactured and sold in the United States. Distribution was in about 160 to 170 cities, having been confined to territories where skilled tile layers were available. About 80 per cent of geographical United States never has had vitreous surface tile available. Since much less skill is required in laying metal porcelain tile, the market for this product shows large possibilities.

New Furnace Will Test Alloy Steels for Oil Industry

Seeking to develop certain alloy steels embodying properties to meet the special requirements of the oil cracking industry, Republic Steel Corp. is building a new furnace in its laboratory at Canton, O., for the purpose of conducting a series of experiments with corrosion-resisting steel tubes for oil refineries. The furnace will test the tubes to destruction under high temperatures and pressures and will enable metallurgists to study the behavior of the tubes under conditions equal to and exceeding those found in actual service.

The outer casing of the furnace is of steel approximately 2½ feet square by 4 feet long. In the center of this casing and insulated from it is an extra heavy wall pipe, 7 inches in diameter, serving as the heating chamber. Four heating elements are placed above and below the pipe. The tube to be tested is placed in the center of the heating chamber and with the use of CO_2 gas high pressures are obtainable and it is possible to break the tube at any given temperature. The tube under test is sealed at each end with a heavy steel plug which is welded in place. The CO_2 gas is passed into the tube through a heavy ¾-inch pipe, a hydraulic gage registering the pressure.

Propose Standards for Pipe Flanges and Fittings

Drafts of proposed American standards for pipe flanges and fittings have been prepared by the American Standards association technical committee on this subject under the sponsorship of the American Society of Mechanical Engineers, the Heating and Piping Contractors National association, and the Manufacturers' Standardization society of the Valve and Fittings Industry. These drafts cover pipe plugs of cast iron, malleable iron, cast steel, and forged steel; steel base-fittings for maximum steam working pressure of 250, 400, 600, and 900 pounds per square inch; and steel companion flanges.

Kitchen and dining room finished entirely, walls and ceiling, with the enameled tiling material, the decorative effect being obtained by the use of different colored tiles

Bullard Company Marks Its Fiftieth Anniversary

Bullard Co., Bridgeport, Conn., well-known builder of production machine tools, has sent out to its customers and friends a folder commemorating the fiftieth annniversary of its foundation. In 1880 Edward Payson Bullard (1841-1906) established his own company at Bridgeport, after wide mechanical experience beginning at the Colt armory in Hartford, continuing at the Pratt & Whitney Co., and rounded out in shops in Norwalk, Conn., Athens, Ga., Cincinnati and Columbus, O., and in New York.

This company, originally called the Bridgeport Machine Tool Works, was incorporated in 1894 as the Bullard Machine Tool Co., this name being shortened to the Bullard Co. in 1929. The first products were high-grade lathes, but in 1883 the manufacture of boring mills was begun. Various developments of that line have since represented the major output of the company.

The anniversary folder carries brief facts as to the development of the company, also reproductions of an oil painting of the founder and of a bronze tablet, both of which have been placed in the lobby of the new administration building. The tablet carries the name of the founder, the dates of his birth and death, and the inscription, "His genius and foresight still guide our progress."

Tests Determine Relative Strength of Iron Ores

A method for testing the relative strength of iron ores has been developed by the bureau of mines, Washington, in co-operation with the Mines experiment station, University of Minnesota, Minneapolis. Previous investigations have shown that the physical condition of the material in the stock column of a blast furnace affects the mechanical operation as well as the efficiency of the furnace.

To carry out the tests two lots about 150 pounds each were prepared from each ore after it had been screen sized. One lot was rolled in a small batch-type rotary kiln for 1½ hours. The ore was removed and screened. Changes in the screen analyses were considered to have been due to mechanical work at room temperature. The other lot was rolled in the same kiln for 1½ hours during which time the temperature was increased from room temperature to 1400 degrees Fahr. The ore was removed and screened. Changes in the screen analyses were considered to have been due to mechanical work and temperature.

Tests on 34 ores indicated that the screen analysis of the ore was not a true measure of its mechanical strength. The average decrease in average particle size was 18 per cent due to cold work and 38.1 per cent due to hot work.

ALL parts of this popular little box camera are made of steel. "Sturdy, light and compact"—these qualities are imparted by the steel

Large Uses of Steel in Small Ways

181st Article ◆ ◆ Cameras

A LARGE tonnage of steel is consumed annually in the manufacture of cameras and accessories. The first cameras made were ordinary wood boxes, with lens at one end and plate holder at the other, and the focusing type with wood frames joined by means of cloth or leather bellows. Practically no steel was utilized in their composition. Even today the high-class studio cameras are made mainly of wood, with cloth or composition bellows, though the metal work is of steel or brass. A large amount of steel is consumed in the manufacture of tripods for the heavier types of cameras, and the light folding type of tripods used by amateur photographers.

Amateurs Aid Industry

Popularity of amateur photography brought into use the small box and folding types of cameras, made of metal, chiefly steel, for lightness, strength and compactness. News and commercial cameras, motion picture cameras and many other types increased the demand for steel from the manufacturers. No reliable statistics are available covering the tonnage of steel used annually in the production of all these various types and accessories, but it is well up in the thousands.

As an indication, the two most popular small box cameras made by a leading manufacturer require 550 tons of steel in a year. The manufacturer writes:

"Steel has been found to be the most satisfactory in these popular cameras for a number of reasons. Of prime importance is the strength which steel gives to the camera. The camera made of steel also is light, and therefore convenient to carry. Then, economy of manufacture enters in, as the steel can be tempered to adapt itself to the complicated shapes required of it, and still be rigid and not brittle.

Three Types of Steel Used

"Three different types of flat rolled steel are used in fabricating these cameras, full-finished sheets, cold-rolled coiled strip and cold-rolled flat strip. The full-finished sheet has one temper due to the extensive molding to which it is subjected. The cold-rolled strip runs in temper from hard to soft, in different widths and coils. Cold-rolled flat strip has the same tempering as coil, and also is received in various widths."

The roll holder, the central object in the illustration showing the group of parts, is the largest piece in the camera and accounts for all of the full finished sheets used. As the name implies this part holds the empty and full film spools. The roll holder tension exerts a slight pressure on the film, which holds it against the roll holder opening when in position for a picture. This is made of coil stock. The back and front of the case also are fabricated of coil stock. Other parts of the same material are the shutter and shutter plate. A fine wire spring is used in most of these box-type cameras to actuate the shutter.

Still simpler types of box cameras for film packs made entirely of steel, also sell in some instances at less than $1 in retail stores, a price which could not be possible were it not for the low cost of steel and economical manufacturing methods offered through the use of steel. These cameras are scarcely more than oblong cans, with the two ends, one holding the lens and shutter, the other the film pack, easily removed. Steel also takes easily a dull black finish for the inside of the camera and an attractive lacquer finish for the exterior.

To Determine Scale Effect in Gas-Fired Furnaces

Research in the deterrent effect of scale in gas-fired furnaces at heat treating temperatures, and in factors affecting short cycle malleablizing is to be carried on by the University of Michigan, Ann Arbor, Mich., for the American Gas association. The research in the deterrent effect of scale follows the research in scaling at forging temperatures which is nearly complete. Scaling enters very definitely into the cost and quality of heat treating, and all factors of the problem are to be considered in order to reduce this charge.

The research in factors affecting short malleablizing is prompted largely by recent developments in this branch of the cast iron foundry industry. In a number of plants, manufacturers of malleable cast iron have adopted a so-called short cycle annealing process by means of which the annealing time is cut very considerably, in some cases from 90 to 25 hours.

Convention Calendar

Jan. 19-23—Society of Automotive Engineers. Annual meeting at Book-Cadillac hotel, Detroit. John A. C. Warner, 29 West Thirty-ninth street, New York, is secretary and general manager.

Feb. 10-13—Mid-West Power Engineering Conference. Annual meeting at Chicago. G. E. Pfisterer, 308 West Washington street, Chicago, is secretary.

Feb. 16-20—American Society for Steel Treating. Semiannual meeting in conjunction with National Western Metal congress at St. Francis hotel, San Francisco, Calif. W. H. Eisenman, 7016 Euclid avenue, Cleveland, is secretary.

Feb. 16-20—National Western Metal congress. Second biennial meeting at Civic auditorium, San Francisco, Calif. W. H. Eisenman, 7016 Euclid avenue, Cleveland, is secretary.

Feb. 22-28—American Ceramic society. Annual exhibit and convention at Public auditorium, Cleveland. Ross C. Purdy, 2525 North High street, Columbus, O., is secretary.

Scanning the Technology of Steel

A Digest of Important Developments in Scientific Research, Engineering Progress and Operating Procedure Pertaining to the Production, Processing, Application and Performance of Steel

USES:

Alloy Steel

Influence of a small addition of copper on the corrosion resistance of structural steel, by O. Bauer, O. Vogel and C. Holthaus, in Metals & Alloys, December 1930, *p.* 890, 5½ *pp.*, 3 *tables*, 16 *charts.*

Development of any alloy for resisting corrosion is always of interest, particularly if the quantity of the alloying element is sufficiently small as to make no appreciable difference in the cost of production. This is the case with the addition of copper to commercial forms of steel. The value of copper steel for resistance to atmospheric corrosion is fairly well established in this country. It is generally considered, however, that for under-water service no marked advantage is gained from the presence of copper. There is still much that remains to be clarified and the work of the German investigators is a valuable addition to data on the subject. Steel prepared by the Vereinigte Stahlwerke A.-G. Dortmunder Union in Dortmunder, was tested in water of a variety of different properties. The steel tested was divided into three classes, soft steel, structural steel, and 0.25-35 per cent carbon steel. The tabulated results of these tests as well as a description of the properties determined is given in the article.

STEEL 12-25-30

Deep Drawing Steel

Selection of thin plate for deep drawing work, discussed by H. T. Morton, in Metal Progress, December 1930, *p.* 54, 6 *pp.*, 8 *illusts.*

Thin plate for deep drawing purposes must have a minimum of slag, other inclusions and internal defects. Tensile strength and per cent elongation have a definite relationship to deep drawing quality. The surface of the strips must be free from seams, laps, scratches and decarburization. The steel must be annealed. The foregoing rules apply to alloy and plain carbon carburizing steels, except that the former have higher tensile strengths and hardness with lower percentages of elongation. No relationship is found between elastic limit or per cent reduction of area and deep drawing quality.

STEEL 12-25-30

FABRICATION:

Nitrided Case

Case hardening of commercial steels by means of nitrogen, by B. Jones, in Iron and Steel Industry, December 1930, *p.* 77, 10½ *pp.*, 7 *tables*, 21 *illusts.*

To carry out complete experiments in this work, five austenitic steels of various combinations were obtained for nitriding together with plain carbon and alloy steels. All the steels treated were, as far as possible, British commercial steels which were readily obtainable and are of everyday use in industry. In the nitriding of austenitic steels it was expected that a concentration of hardness would occur along the corner of the specimen, so the nitrided steel was sectioned on approximately a 5-degree taper, by means of an "elastic" carborundum wheel under cold water, and prepared for microscopic examination. Realizing that the chemical composition of a steel appeared to play the chief role in efficient case hardening by means of nitrogen, commercial steels of different chemical elements were obtained and investigated. It was found in part, that austenitic steels which retain the austenitic structure after nitriding treatment do not case harden by means of nitrogen; mild steel nitrides to a greater extent than high-carbon steels; nickel steels do not nitride; chromium steels possess nitriding properties; and aluminum additions induce good nitriding properties.

STEEL 12-25-30

Structural Design

Innovations in the design of the A. O. Smith Corp. laboratory, described in Engineering News-Record, Dec. 4, 1930, *p.* 881, 3½ *pp.*, 6 *illusts.*

The latest and most thought-provoking structure to be dedicated to industrial research is the building just completed in Milwaukee by the A. O. Smith Corp. This organization has blazed some new trails for structural engineers to explore. The omission of interior columns is something to consider, and the utilization of hollow columns and girders as pipe and conduit shafts similarly commands attention. Unobstructed floor areas, walls composed largely of glass, easy connection to any utility service at any part of a floor, welded steel floor, and provision for future alterations and interior rearrangement of rooms or laboratories are other important features. The structural design is analyzed and explained, while the purposes underlying all new designs are developed.

STEEL 12-25-30

PRODUCTION:

Steelmaking

Fundamental and applied research on the physical chemistry of steelmaking, described by C. H. Herty Jr., in Metals & Alloys, December 1930, *p.* 883, 7 *pp.*, 13 *illusts.*

The work on the physical chemistry of steelmaking as carried out at the Pittsburgh Experiment station of the bureau of mines, in co-operation with the Carnegie Institute of Technology and the Metallurgical Advisory board, has covered a series of fundamental studies on the action of oxygen in liquid steel and the application of the findings to open-hearth practice. The general method of studying oxygen has been, first to determine the solubility of the various oxides in liquid steel. The solubility of iron-oxide in steel has been determined over a wide temperature range. Second, a study was made of the equilibria and types of inclusions formed when highly oxidized steel was deoxidized with various alloys. Concurrently, the slag systems which were involved were studied by the synthesis of the slags in the induction furnace and their examination under the microscope and determination of their melting points by the micro-pyrometer method.

STEEL 12-25-30

Machine Tools and Plant Equipment

«Without machine tools modern machinery could not be built.»
—Joseph W. Roe

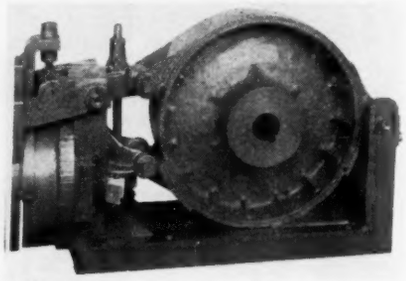
Bench Drill Has Ample Overload Capacity

Buffalo Forge Co., Buffalo, has introduced a motor-driven bench drill, shown in the accompanying illustration, on which it is claimed that it is impossible to stall the motor or to slip the belt up to 150 per cent of the rated capacity.

The machine has a substantial box frame, with a gooseneck carrying the drilling head balanced by the motor which is carried by a boss on the back of the gooseneck. The motor, which is of the 4-horsepower, vertical, ball-bearing type with high starting torque, drives the spindle direct through a V-belt, three-step cone pulleys giving spindle speeds of 850, 1750 and 300 revolutions per minute. Hand knobs give horizontal movement to the motor to adjust the belt.

The spindle runs in generous bronze bearings, is fed into the work by a hand lever, and returned by a spring. It is furnished with a chuck for handling drills up to ½-inch, which is the maximum capacity in cast iron. The throw of the spindle is 3½ inches, vertical adjustment of the 7-inch square oil trough table is 10 inches, distance from column to center of drill is 5⅛ inches, and the weight with motor is approximately 105 pounds.

Bench machine will drill up to ½-inch diameter in cast iron



Magnet-operated industrial brake has automotive type contracting bands

◆

Magnetic Band Brakes Stand Heavy Duty Service

General Electric Co., Schenectady, N. Y., has announced a line of clapper magnet-operated band brakes for direct-current motors. These brakes, one of which is shown in the accompanying illustration, were designed primarily for heavy-duty service such as on cranes and hoists, steel mill machinery, and similar applications.

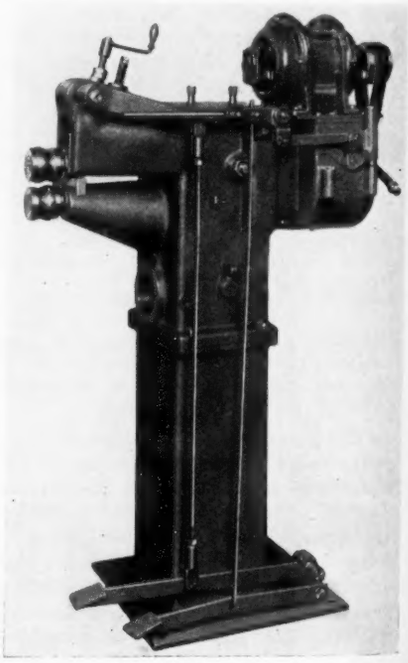
The new brake operates in the same manner as an external contracting band type automobile brake. It is applied by a spring and released by a magnet. It can be furnished to operate either in synchronism with the starting and stopping of the motor or independently, one type having a series wound coil and the other a shunt wound coil. In the case of independent action, the motor control is provided with a "drift" point at which the current is cut off the motor but the brake is not applied.

About 90 per cent of the wheel surface is used for braking, thus reducing the wear on the brakes. The pressure per square inch for a 30-minute rating is approximately 15 to 18 pounds. Braking is equally positive in either direction of revolution of the drum.

Combination Machine Has Wide Capabilities

Niagara Machine & Tool Works, Buffalo, has put on the market a motor-driven combination machine for turning, wiring, crimping, beading, slitting, flanging, etc., with capacity to handle up to 14-gage mild steel. This machine, which is shown in the accompanying illustration, is of particular interest to manufacturers of metal drums, ventilating equipment, machinery guards, etc.

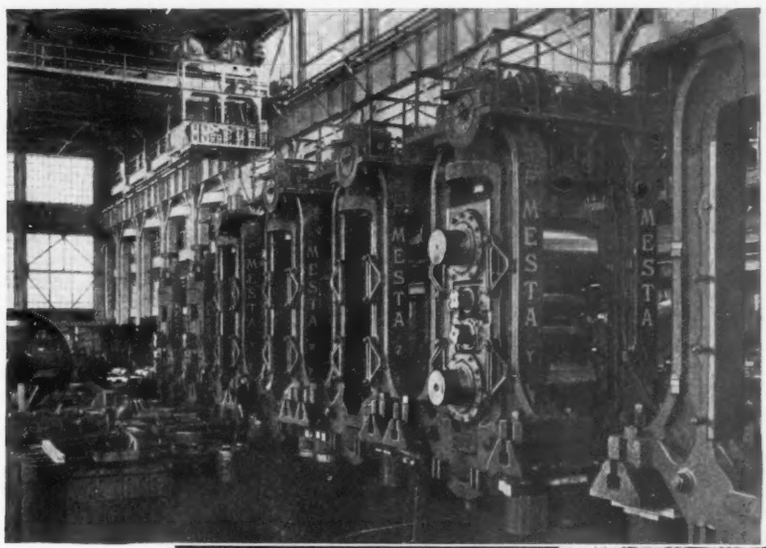
Heavy construction measuring up to the best machine tool standards is followed in order to attain strength, rigidity, accuracy and operating convenience. The head is mounted on a welded steel column. The heavily ribbed box frame encloses shafts and gears and carries the motor drive unit. Vertical adjustment of top roll is accomplished by a crank handle and a foot treadle, each working independently of the other. Lateral adjustment and locking of the upper shaft is by means of two opposed knurled hand screws of generous size, located at the top of the ma-



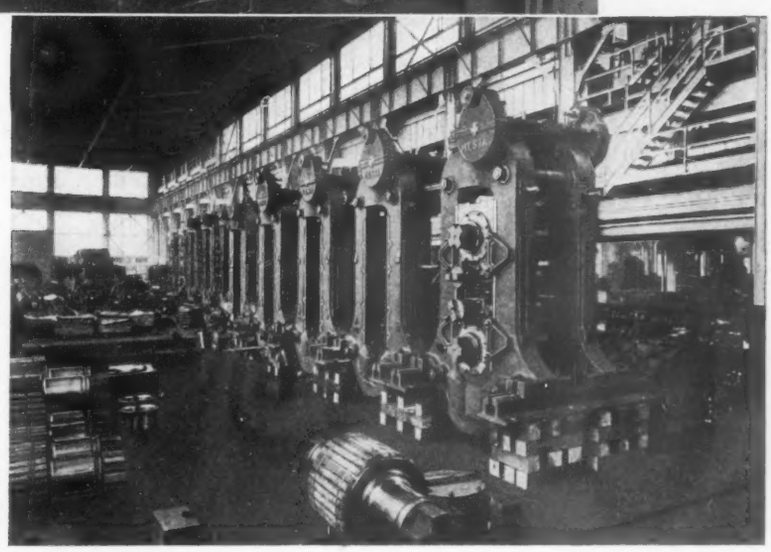
This compact machine does flanging, crimping, turning and beading

FOUR HIGH CONTINUOUS MILLS

For Rolling Wide Strip



Four High 60″ Hot Strip Mill on Mesta Erecting Floor

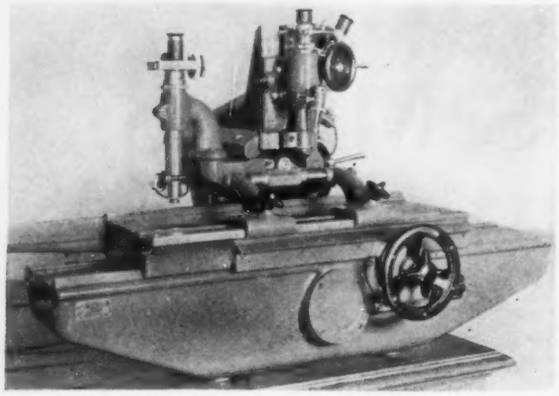


Four High Cold Strip Mills on Mesta Erecting Floor

Designed and Built by

MESTA MACHINE COMPANY

Pittsburgh, Penna.



This instrument, utilizing precision slides, finely divided scales and built-in microscopes, brings laboratory accuracy to production work in the shop

chine. These move the entire rocking box carrying the upper shaft bearings, which insures full bearing support to the shaft in any position.

Rolls and gages both are interchangeable, the rolls being keyed to the shaft ends and are held in place securely by collar screws flush with their ends. Special rolls can be furnished for unusual operations, and provision is made in the frame for the application of a special horn. Circular shearing can be done by mounting a circle arm on the horn and using slitting cutters on the roll shafts. Also, round blanks can be flanged by attaching a yoke and pivot arm for presenting the blanks to special flanging rolls, the yoke being tilted gradually until the correct angle is attained.

◆

Measuring Machine Permits 0.00005 Inch Readings

Societe Genevoise d'Instruments de Physique, Geneva, Switzerland, has announced through its representative, R. Y. Ferner Co., Washington, a new precision measuring instrument suitable for general use in connection with inspection work in industrial plants. The instrument, shown in the accompanying illustration, will carry out measurements in two coordinates on profile gages, templets, cams, small jigs, thread cutters, dies, etc. An optical method also is available for the testing of thread gages, micrometer screws, worms and taps, etc.—the tests covering pitch, angle of profile and diameter. Measurements of photographic negatives and prints, oscillograph films, x-ray pictures and spectrographic plates can be made effectively.

To preserve accuracy at varying temperatures the two accurately graduated scales are made of a nickel steel alloy containing 58 per cent of nickel, giving the same coefficient of expansion as the steel parts commonly measured. This material resists corrosion and takes a high polish on which division lines of microscopic fineness can be ruled.

The heavy, scientifically proportioned cast iron bed carries two slides movable at right angles to each other on Vee and flat ways. The longitudinal slide has 16-inch travel, rapid traverse being given by rack and pinion and fine settings by worm and worm wheel. The 16-inch precision scale is shielded in a casing at the rear of the slide, and its microscope permits readings to 0.00005-inch per division. The longitudinal slide is open to permit illumination from below, the pieces to be measured being clamped into interchangeable fixtures, of which three are furnished. One of these fixtures is a substantial Tee-slotted cast iron work table which permits of laying out work by punching. A glass table is provided for work on negatives, illuminated from below, while the third fixture holds work between centers.

The transverse carriage, having 4-inch travel, carries a second microscope for measuring the crosswise coordinate to the same degree of accuracy as the longitudinal. A tool holder is provided for carrying punches, centering dial indicators, etc. Various extra equipment, including special illumination devices, a circular table and camera lucida can be furnished.

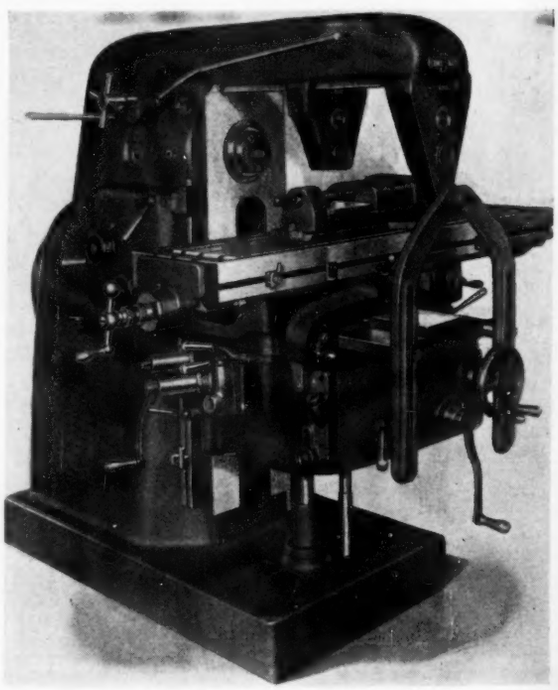
◆

Improved Milling Machines Are of Three Types

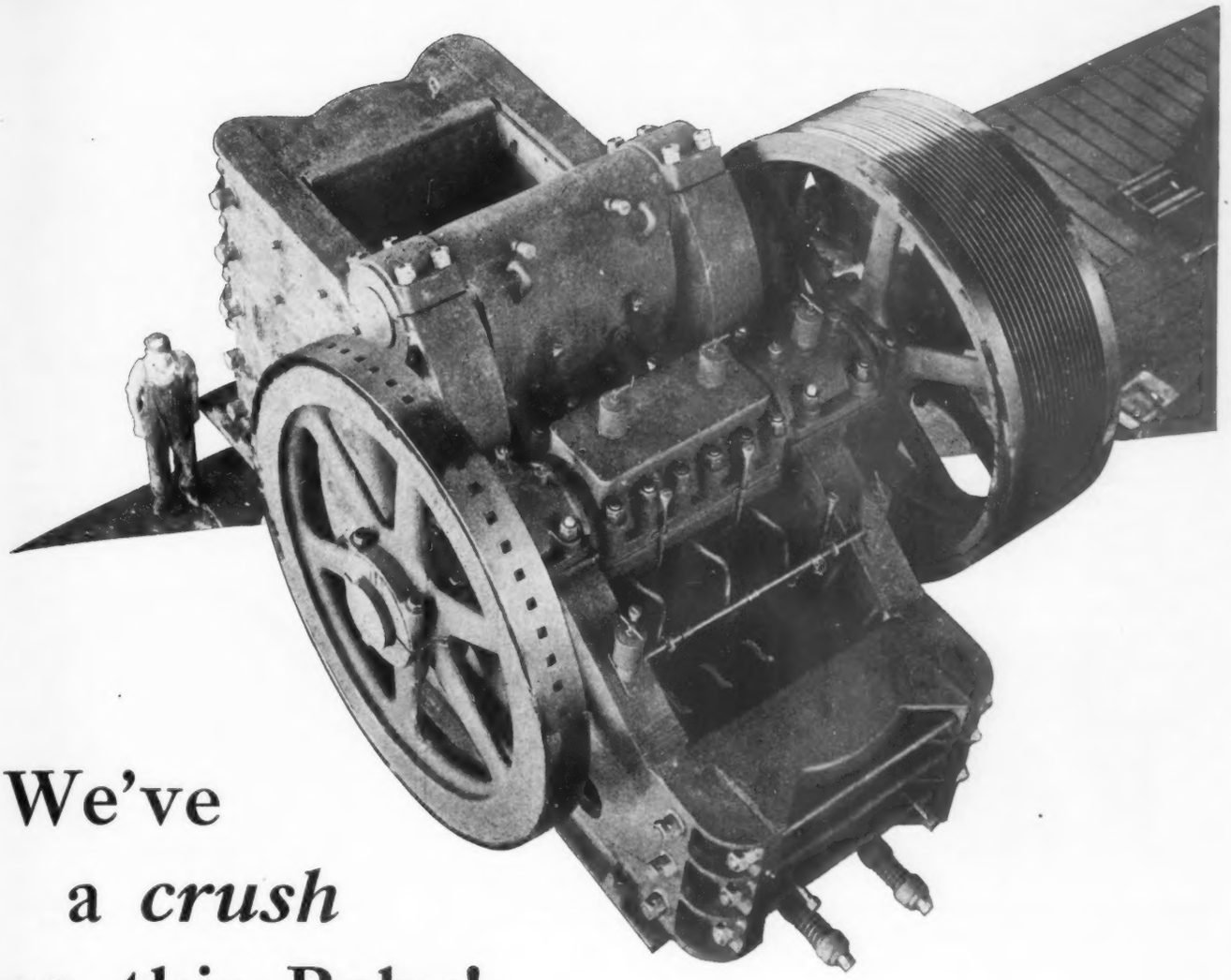
Cincinnati Milling Machine Co., Cincinnati, recently has brought out a new line of knee and column milling machines, which are furnished in plain, universal and vertical styles. The accompanying illustration shows one of the plain type.

These machines feature complete control either from the front or from the rear. Sixteen spindle speeds, ranging from 20 to 500 revolutions per minute, and 16 table feeds, ranging from 1 to 20 inches, are available through an automatic power shift mechanism having speed and feed dials.

Antifriction bearings are used throughout in the spindle drive, a double system of mounting the front and rear spindle bearings, with the rear set self-compensating, being employed. A new system of proportioned



Convenience of control, either from the front or from the rear, characterizes this line of knee and column milling machines, which are designed for usefulness on general production work as well as in the tool room



We've a *crush* on this Baby!

—even tho' she's an offspring of our own, with a flattering avoirdupois of well over a quarter million in pounds. She's a *crusher* by trade . . . squeezes big ones into little ones, making light of the masses.

Built in record time, her vitals click with the rigors of Birdsboro open hearth steel . . . frames alone expressing rigidity with their 110,000 pounds. As a unit in herself she bears recognition to foundry, machining and handling facilities—displaying, in tonnage, what the well equipped plant can create.

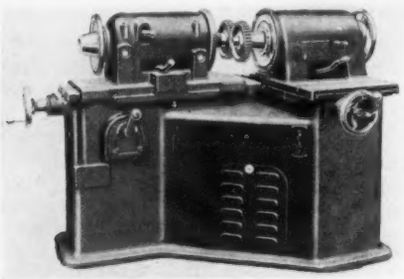
This "*baby*" happens to be a 48 x 60, Type C Jaw Crusher, constructed by Birdsboro for the C. G. Buchanan Company of New York City—selling agents for famed Buchanan Crushing and Concentrating Machinery.

BIRDSBORO
STEEL FOUNDRY AND MACHINE COMPANY
DESIGNERS AND BUILDERS
BIRDSBORO, PENNSYLVANIA

sliding gears is used in the drive, these being carried on heat-treated splined shafts. The column mechanism, including the spindle drive, and speed and feed shifting mechanism, is lubricated automatically by a geared pump within the column. A pump also is provided to lubricate the knee, while a one-shot pressure system is used for saddle and table ways.

Leadscrew design has been improved, the diameter having been increased, and a longer bearing given to the leadscrew nut. The ends of the screw are carried in tapered roller bearings. The elevating screw is of the one-piece type, which requires no sleeve, and the thread bearing on its nut is unusually generous.

A pyramid-shaped column and solid top knee insure rigidity and accuracy.



Running tests on spur gears is the purpose of this machine

The knee has a narrow guide and improved system of gibbing designed to prevent tipping of the table when heavy loads fall at the extreme position of travel. The rigid rectangular overarm carries two self-oiling aluminum supports, which are light enough to be handled with ease by the set-up man. The vertical machine is similar to the plain and universal types, except that the vertical spindle is mounted in a head adjustably clamped to the frame. It may be provided with hand or power feed, power feed including rapid traverse of 25 feet per minute.

◆

Spur Gear Testing Machine Is Built for Precision

Gleason Works, 1000 University avenue, Rochester, N. Y., has brought out a new type of hydraulically-operated machine for testing the running qualities of spur gears up to 14½-inch diametral pitch. This machine, shown in the accompanying illustration will handle cluster gears, gears with integral shanks, helical gears, herringbone gears, and internal spur gears. The test is accomplished by running gears together in pairs or by running several gears successively with a test pinion, either without load or under load applied by a manually-operated brake on the driven spindle.

To insure the extreme accuracy demanded, the right angle shaped frame is of heavy box type, liberally ribbed and cross braced. Bearing ways on the frame are wide, and close alignment is attained by narrow guides. The two work heads are adjusted horizontally on the frame by means of handwheels and leadscrews, with dials reading to 0.001 inch. They hold the spindles precisely in the same plane and parallel, both heads being locked to the frame at front and rear by separate clamps which are given equal tension by a single lever.

The spindles have heat treated noses with taper bores ground with the spindles in place on their preloaded matched ball bearings, this insuring exact concentricity between bearings and bores. Oil is filtered through oil cups cast integral with the heads before reaching the bearings. A 5-horsepower motor located in the base drives the spindles, a variable-speed motor with range from 300 to 1200 revolutions per minute being recommended.

Standard equipment includes all necessary gages, tools and an outboard support for long integral shank gears, but arbors must be ordered as extra equipment. Motor-driven pump, sump and guards can be furnished to permit running gears together with mild abrasive to remove minor roughness resulting from heat treatment. The machine occupies 61½ x 77 inches of floor space and its net weight is about 4000 pounds.

◆

Push Button Switch Allows Momentary Contacts

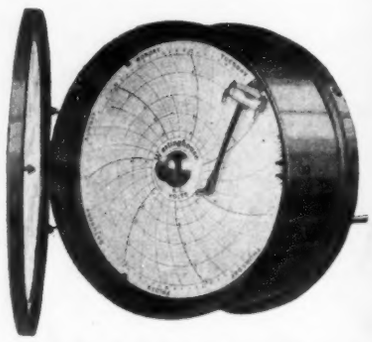
Monitor Controller Co., Baltimore, has designed a momentary contact control type of push button switch which is especially suited for machine service. The switch will operate on either alternating or direct-current circuits. The location of buttons on the switch is conducive to unusual safety, the "stop" button being large and located on the top of the switch, where it is fully exposed and easy to operate quickly, while the "start" button is below, where it is fully protected from accidental contact. There are no horizontal projections.

The construction is simple, consisting of the base which carried the wiring and fixed contacts and the cover carrying the buttons. Conduit connections can be made from top, bottom or either side. Special construction makes the switch drip and splash proof. Quick action inching or jogging is another feature claimed for this design. The compactness of the switch is indicated by its overall dimensions which are: Height 4½ inches; width, 2-15/16 inches; and depth from mount, 2-⅝ inches.

◆

Instrument Draws Graph of Motor Performance

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has announced a new line of recording instruments with circular charts which are made



Performance data are charted by this compact recording instrument

for switchboard mounting or for use as portable recorders. The instruments, shown in the accompanying illustration, are small and light, and are built in both ammeter and voltmeter models. Among the applications for this equipment in industry are; the determining of the most economical use of motor-driven machinery, the loading of motors, time of starting in the morning, after the noon lunch hour, and time of shutting down, quitting, loss of time, and power required for various operations and for various depths of cuts.

This instrument uses for the measuring unit a small motor mechanism, in which a laminated armature core or "rotor" is mounted in the field of an electromagnet. The air gap surfaces of the pole pieces are arranged to give as uniform a scale as is consistent with good performance at light loads. No delicate pivots or jewels are used for bearings. The force is provided by heavy springs. The main shaft operates the pen directly, and the mechanism as a whole is damped by means of an aluminum disk arranged to swing in the air gaps of a set of permanent magnets. It is designed primarily for alternating-current applications, but is applicable also to direct-current service.

Year-End Letdown Is Discounted

Sentiment in Steel Is Buoyed Moderately by Sheet Contracting, Structural Activity, Rail Orders — Steel Operations Fall Below 35 Per Cent

AS USUAL at this season, holiday and inventory shutdowns are depressing the purchasing, production and shipment of steel. Launched from an abnormally low level, the consequence of 11 months of declining activity, the year-end dip probably will be the most pronounced in at least six years, and there are no illusions that the industry will snap back promptly after New Year.

In some districts the policy of banks to deal drastically now with doubtful financial situations in order to know the worst before 1931 opens has lent further discouragement. Yet, the industry as a whole has discounted the present period of minimum activity, sentiment is not unduly dejected, and there are occasional signs in the market that some improvement is near.

Contracting for sheets for the first quarter is moderate to excellent in practically all districts despite the loathness of automotive consumers to commit prior to the verdict of the January shows. Between now and the year end the railroads will put about 400,000 tons of rails on mill books, and they have fair inquiry out for equipment. Structural steel inquiry is broader.

First signs of support for steel from emergency public construction have appeared at Chicago, where bridges for the Lakes-to-Gulf waterway, expected to be expedited by congressional appropriations, require 30,000 tons. Forty thousand tons of structural work is pending at Chicago, with a like tonnage in prospect.

For a bridge at St. Charles, Mo., the Wabash railroad will buy 17,700 tons. Inquiry at San Francisco totals 18,000 tons. At New York, 7500 tons for subways and 6500 tons for a penitentiary have been let. This week's structural awards 35,671 tons, compare with 37,007 tons last week and 57,115 tons a year ago.

New York Central is formally distributing 170,000 tons of rails, with track fastenings to follow. The Pennsylvania award of 150,000 tons, with 50,000 tons additional optioned, is near but awaits a decision on a new section. Other rail awards this week include 10,000 tons by the Denver & Rio Grande and 5000 tons by the Chicago Great Western.

Bessemer & Lake Erie is in the market for 1000 to 1200 hoppers. Distribution of 3000 cars by the Canadian National awaits formal action by the dominion government. Canadian Pacific has bought 250 refrigerator and 210 miscellaneous cars. North American Car Corp. will build 50 refrigerator cars in its own shops. New York Central has bought 50 passenger engines.

Sheet specifications and bookings by some Pittsburgh district mills have been the best in several weeks, chiefly from non-automotive sources, but by late January producers believe automotive consumption will have recovered measurably from its present extreme depression.

Recent contracting for pig iron has covered 50 to 70 per cent of probable first quarter output. Production in the Mahoning valley has been reduced to three stacks active out of 34. The one active stack in Virginia has been blown out, with 40,000 tons of iron piled. Scrap prices continue in delicate balance, some grades being slightly higher at Pittsburgh. Detroit has placed 11,000 tons of cast iron pipe; Milwaukee has 6000 tons pending.

Steelmaking operations opened the week at 33 to 35 per cent, but most mills will be idle Wednesday night to Monday morning. Buffalo mills have unexpectedly expanded from 24 to 30 per cent. Cleveland mills maintain a 48 per cent rate. Other districts are lower, Birmingham being below 40 per cent, Pittsburgh 25-30, Youngstown 23, Chicago and Philadelphia 30-35.

Elimination of concessions under 1.60c, base, Pittsburgh, on steel bars, plates and shapes represents an accomplishment and encourages producers to believe sometime next quarter—possibly January—they can begin to establish the 1.65c level for first quarter. Cut nails are now quoted on a Pittsburgh instead of a mill basis. Heavy steel contracts carry through to March 31 instead of March 15.

Foundry iron at Philadelphia has been reduced 50 cents, resulting in a decline of 2 cents in STEEL's market composite to $31.66.

Composite Market Averages

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe.

This week (Dec. 24, 1930)	**$31.66**
Last week (Dec. 17, 1930)	**31.68**
One month ago (November, 1930)	**31.92**
Three months ago (September, 1930)	**32.65**
One year ago (December, 1929)	**35.95**
Ten years ago (December, 1920)	**54.04**

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	Dec. 24, 1930	Nov. 1930	Sept. 1930	Dec. 1929
PIG IRON				
Bessemer, del. Pittsburgh	$18.76	18.76	20.13	20.76
Basic, valley	17.00	17.00	17.75	18.50
Basic, eastern del. eastern Pa.	17.50	17.50	17.88	19.75
No. 2 foundry, del. Pittsburgh	18.26	18.26	19.13	19.76
No. 2 foundry, Chicago	17.50	17.50	17.50	20.00
*Southern No. 2, Birmingham	14.00	14.00	14.00	14.25
**No. 2X, Virginia furnace	18.25	18.25	18.25	18.25
**No. 2X, Eastern del. Phila.	18.26	19.26	19.76	21.76
Malleable, valley	17.50	17.50	18.35	19.00
Malleable, Chicago	17.50	17.50	17.50	20.00
Lake Superior, charcoal, del. Chi.	27.04	27.04	27.04	27.04
Gray forge, del. Pittsburgh	17.63	17.63	18.50	19.13
Ferromanganese, del. Pittsburgh	89.79	103.79	103.79	104.79

*1.75 to 2.25 silicon. For local delivery. Northern shipments based on $12 to $13, Birmingham. **2.25 to 2.75 silicon.

COKE				
Connellsville furnace, ovens	2.50	2.55	2.60	2.65
Connellsville foundry, ovens	3.50	3.50	3.50	3.50
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngs.	30.00	31.00	31.00	34.00
Sheets bars, open-hearth, Pitts.	30.00	31.00	31.00	34.75
Billets, open-hearth, Pittsburgh	30.00	31.00	31.00	34.75
Wire rods, Pittsburgh	35.00	36.00	36.00	40.00

	Dec. 24. 1930	Nov. 1930	Sept. 1930	Dec. 1929
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.60	1.60	1.60	1.90
Steel bars, Chicago	1.70	1.70	1.70	2.00
Steel bars, Philadelphia	1.89	1.89	1.89	2.22
Iron bars, Chicago	1.70	1.70	1.75	2.00
Shapes, Pittsburgh	1.60	1.60	1.60	1.90
Shapes, Philadelphia	1.76	1.71	1.66	1.91
Shapes, Chicago	1.70	1.70	1.70	2.00
Tank plates, Pittsburgh	1.60	1.60	1.60	1.90
Tank plates, Philadelphia	1.80½	1.805	1.805	2.10
Tank plates, Chicago	1.70	1.70	1.70	2.00
Sheets, blue anl., No. 13, Pitts.	2.05	2.05	2.10	2.15
Sheets, black, No. 24, Pitts.	2.35	2.35	2.40	2.75
Sheets, gal., No. 24, Pittsburgh	2.90	2.95	3.00	3.40
Sheets, black, No. 24, Chicago	2.50	2.45	2.60	2.90
Sheets, blue anl., No. 13, Chicago	2.20	2.30	2.30	2.50
Sheets, galvanized, No. 24, Chi.	3.05	3.15	3.25	3.60
Plain wire, Pittsburgh	2.20	2.30	2.30	2.40
Wire nails, Pittsburgh	1.90	1.90	2.00	2.40
Tin plate, per base box, Pitts.	5.00	5.00	5.25	5.35
SCRAP				
Heavy melting steel, Pitts.	12.75	13.10	15.70	15.10
Heavy melting steel, eastern Pa.	11.00	11.50	13.00	14.50
Heavy melting steel, Chicago	10.00	10.20	12.25	12.50
No. 1 wrought, eastern Pa.	13.50	13.50	14.25	15.25
No. 1 wrought, Chicago	10.00	10.00	11.25	13.25
Rails for rolling, Chicago	13.00	13.10	14.50	14.60

Sheets

New Business Developing in Larger Volume, Despite Seasonal Decline in Mill Operations

SHEET PRICES, PAGE 61

Pittsburgh—Sheet business shows more activity than anticipated for this period. Specifications and new business for some producers are the best in two months. Most incoming tonnage is for January shipment and mill operations are expected to continue low the remainder of December. Sheet production which recently was increased to about 35 per cent will be sharply reduced on the average for this week with most mills scheduled to be down from Wednesday on. Sheet prices are holding well with divergence from the regular market noted in only occasional instances. Producers usually quote 2.35c for black sheets, 2.90c for galvanized, 1.90c for blue annealed plates and 3.30c for autobody.

New York—Sheet demand has improved, particularly for blue annealed. Sellers assert contracting is being done by some of the larger consumers. Indications are that specifying will not be active until around the latter part of January. Prices are steady. The 2.90c, Pittsburgh, price on galvanized sheets has virtually disappeared, with 3.00c the prevailing figure. Black sheets are 2.35c, Pittsburgh; No. 10 blue annealed, 1.90c; and No. 15 blue annealed, 2.05c.

Philadelphia—Sheet specifications show a decided improvement to take advantage of old prices and mills will have some carryover to January. Black sheets continue firm at 2.35c, Pittsburgh; galvanized are 2.90c to 3.00c; blue annealed 1.90c and 2.05c, for heavy and light gages respectively, with widths over 48 inches especially firm. A feature is the firming of the extra on full pickled sheets in gages from 17 to 21, on which the card extra is $1 a ton.

Youngstown, O.—While irregularity of operations feature the independent sheet industry in this district, new business for first quarter is coming to mills in encouraging tonnages. Besides certain builders of medium price automobiles, furniture makers are resuming more actively than at any time in six weeks, and are placing orders for materials. Sheetmakers feel they have reached the bottom of the slump in operations, and incoming orders for 1931 give a cheerful tone to trade. Quotations are firm at 2.35c, Pittsburgh, for common black, 3.30c for autobody and 3.00c for galvanized, for first quarter. December shipments from certain mills have shown marked improvement over November, while incoming specifications for next month indicate January will show still better shipments.

Cleveland — Specifications from stove manufacturers increased during the past week while those from the automotive industry fell off. Metal furniture manufacturers and others have ordered material for shipment after the first of the year. Some users of autobody sheets have suspended shipments until after inventories. The local plant of Empire Steel Corp., idle since a year ago last October, started up Sunday at midnight for a 3-day run. It expects to operate further after the holidays. Vacuum cleaner manufacturers have been active in purchasing electrical sheets. With 3.20c, Pittsburgh, reported on full finished in the Detroit area, sellers here claim to be adhering to a 3.30c minimum. Black sheets are held here at 2.35c, Pittsburgh, 2.25c having disappeared. Contracting for the first quarter of 1931, is meager.

Chicago—Only large jobbers and carload buyers are obtaining the 3.05c, Chicago delivered price for No. 24 galvanized sheets. An important percentage of No. 24 black sheets is being contracted at 2.60c, delivered, but 2.50c rules for tonnages. Mills, at 50 per cent operations for the first half of this week, see a higher rate early next month. Producers feel they are in a good position on contracts.

Current Finished Steel Prices

Prices in cents per pound unless otherwise stated

Steel Sheets

SHEET MILL BLACK, NO. 24

Pittsburgh base	2.35c
Philadelphia, delivered	2.64c
Gary, Indiana Harbor	2.45c to 2.55c
Chicago, delivered	2.50c to 2.60c
Birmingham, base	2.50c to 2.60c
St. Louis, del.	2.80½c

TIN MILL BLACK, NO. 28

Pittsburgh, base	2.65c to 2.75c
Gary, base	2.75c to 2.85c

GALVANIZED NO. 24

Pittsburgh, base	2.90c to 3.00c
Philadelphia, delivered	3.19c to 3.29c
Gary Indiana Harbor	3.10c
Chicago, delivered	3.15c
Birmingham, base	3.15c
St. Louis, del.	3.35½c

BLUE ANNEALED SHEETS NO. 13

Pittsburgh, base	2.05c
Chicago, district mills	2.25c
Chicago, delivered	2.30c
St. Louis, delivered	2.50½c
Philadelphia, delivered	2.34c
Birmingham	2.20c to 2.25c

BLUE ANNEALED PLATES, NO. 9-10

Pittsburgh, base	1.90c
Chicago, district mills	2.10c
Chicago, delivered	2.15c
Philadelphia, delivered	2.19c
St. Louis, delivered	2.35½c
Birmingham	2.05c to 2.10c

AUTOMOBILE NO. 20

Pittsburgh, base	3.30c

FURNITURE NO. 24

Pittsburgh, patent leveled	3.60c

Tin and Terne Plate

Prices per 100-pound box Pittsburgh

Tin plate, coke base	5.00

Gary, Ind., base 10 cents higher.

Long ternes, 24, assorted	3.55c
Long ternes, 24, unassorted	3.45c

Wire Products

(To Jobbers-Merchant Trade)

F.o.b. Pittsburgh, Cleveland base
(Per 100 pound keg)

Standard wire nails	$1.90 and 2.00
Cement coated nails	1.90 and 2.00
Galvanized nails	3.90 and 4.00

(Per pound)

Polished staples	2.35c and 2.45c
Galvanized staples	2.60c and 2.70c
Barbed wire, gal.	2.55c and 2.65c
Annealed fence wire	2.05c and 2.15c
Galvanized wire	2.50c and 2.60c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c to 2.30c
Spring wire	3.30c
Wire, delivered Detroit	2.50c
Nails, delivered Detroit	$2.35

Joliet, DeKalb, Waukegan, Ill., Anderson, Ind., Chicago, $1 over Pitts.-Cleve.; Duluth and Worcester, Mass., $2 higher; Fairfield, Ala., $3 higher.

Rivets

Struc. c.l., Pitts.-Cleve.	2.75c
Struc., c.l., Chicago	2.85c
**7/16-inch and smaller, Pitts.	70, 10 and 5 off
Chi., Cleve.	70 to 70, 10 and 5 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Steel Plates

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.80½c to 1.85½c
New York, del.	1.88c to 1.93c
Boston, del.	2.00c to 2.05c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.78½c to 1.83½c
Lackawanna, N. Y., base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Coatesville, Pa., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.10c to 2.20c
St. Louis, del.	1.95½c

Structural Shapes

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.76c to 1.81c
New York, del.	1.75½c to 1.85½c
Boston, del.	1.88½c to 1.98½c
Chicago, base	1.70c to 1.75c
Cleveland, delivered	1.78½c to 1.83½c
Lackawanna, N. Y., base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Pacific Coast, c.i.f.	2.15c to 2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.60c to 1.65c
Chicago, base	1.70c to 1.75c
Birmingham, base	1.75c to 1.80c
Lackawanna, N. Y., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.25c
Cleve. base, local del.	1.65c
Do, outside delivery	1.65c
Philadelphia, del.	1.89c to 1.94c
New York, delivered	1.93c to 1.98c
Boston, delivered	2.00c to 2.05c
Pittsburgh, cold finish	1.75c to 1.80c
Pittsburgh, forg. qual.	1.85c to 1.90c

RAIL STEEL

Chicago Heights	1.65c
Eastern mills	1.65c

IRON

Chicago, base	1.70c to 1.75c
New York, delivered	2.08c
Philadelphia, delivered	1.89c to 1.94c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pitts., billet cut lengths	1.90c to 2.00c
Stock lengths, mill	1.65c to 1.75c
Chi. billet	1.70c to 1.80c
Chi., rail steel	1.50c to 1.60c
Philadelphia, cut lengths	1.99c to 2.04c

Cold-Finished Steel Bars and Shafting

Base, Pittsburgh, Chicago, Buffalo and Cleveland	2.00c to 2.10c
Shafting, turned and ground, mill	2.45c to 2.90c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel

Sheets, 35c; plates 31c; bars 28c

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot strip	19c	20.5c	23c	28c
Cold strip	28c	29.5c	32c	37c

Carbon 0.12 and under; no nickel. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads. Pitts. dist.	$6.50 to $6.75 off
Carloads. Chicago dist.	6.70 to 6.80 off

Alloy Steel

Hot Rolled—F.o.b. Mills

Alloy Quality Bar Base is 2.65c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	1.25-1.75 Ni	1.05
2100	0.55	5100 .80-1.10	
2300	1.50	Cr.	0.45
2500	2.25	5100 Chr.	
3100	0.55	spring	0.20
3200	1.35	6100 bars	1.20
3300	3.80	6100 Spring	0.95
3400	3.20	Chr., Ni., Van.	1.50
4100 .15 to .25		Carbon Van.	0.95
Mo.	0.50	9250 (flats)	0.25
4600.20 30 mo.		9250 (rds., sq.)	0.50

Strip, Hoops, Bands

Hot strip, to 6-in., Pitts.	1.65c to 1.70c
Hot strip 6 1/16 to 24-in. Pitts.	1.55c to 1.60c
Hot strip, bands 6 in. and under, Chicago	1.80c
Do. 6 1/16 to 24 in.	1.70c
Cooperage hoop, Pitts.	1.90c to 2.00c
Do, Chicago	2.00c to 2.10c
Cold rolled strip, Pitts., Cleve., 3 tons, over	2.25c to 2.35c
Worcester, 3 tons, over	2.50c

Rails, Track Material

Standard bess. and open hearth rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 28.00
Light rails, 25-45, mills	$34.00
Angle bars, Chi. base	2.75c
Spikes, railroad, mills	2.80c
Spikes, railroad, 7/16-in. and smaller, Pitts.	2.80c
Spikes boat, barge, Pitts.	3.00c
Spikes, railroad, Chi.	2.80c
Track bolts, Pitts., steam roads	3.80c
Do. standard, jobbers	73 off list
Track bolts, Chicago	3.80c
Tie plate, mills	$39.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ..... 73 off

Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.

Eagle list ..... 73 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ..... 73 off

Tire bolts, 60, 10 and 10 off.

Stove bolts, 80, 10, 10, 5 off in pkgs.; 80, 10, 5, 2½ off in bulk.

Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ..... 73 off

HEXAGON CAP SCREWS

Milled ..... 80-10-10-5 off

Upset 1 in. diam. and smaller ..... 85-10 off

SQUARE HEAD SET SCREWS

Milled ..... 80-5 off

Upset 1 in. and smaller ..... 80-10-5 off

Upset, larger than 1 in. ..... 80-5 off

Cut Nails, Chain, Piling

Cut nails, c.l., Pittsburgh	2.40c

do, less carloads, 5 kegs or over, 2.65c; and less than 5 kegs, 2.80c.

Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Sheet piling, Pitts.	2.00c

Bars

First Quarter Contracting Is Fair—Fourth Quarter Tonnage Being Specified Freely

BAR PRICES, PAGE 61

Chicago—No first quarter tonnage in bars, plates and shapes is being booked at 1.70c, Chicago, yet little effort is being made at this time to put over the $1 advance announced recently. It seems certain that a relatively high percentage of the 90-day contract tonnage booked recently will be carried over, due to inconvenience in shipping and receiving material at this time. The advance appears to have been constructive in that it has added solidity to the 1.70c price. A fairly even flow of specifications has characterized the western finished steel market in the last eight weeks, although the volume is becoming more variable due to holiday interruptions. Bar mills are operating at 40 to 50 per cent, with no backlogs. While two tractor builders are taking material for their Russian export orders, other implement and tractor makers are on a part-time operating basis, some largely to keep organizations together by providing nominal employment. Several smaller implement works, customarily starting winter operations in October for a straight production schedule for the spring trade, still are idle and undecided as to schedules. Rail steel bars are holding at 1.65c, Chicago Heights.

New York—Steel bars are 1.60c to 1.65c, Pittsburgh, with the market still subject to test. Notwithstanding covering by some of the larger consumers at 1.60c, Pittsburgh, for first quarter, there is some contracting at 1.65c, but it is still too early to tell whether these prices will hold. The tone has been strengthened somewhat by the possibility of a further advance about the middle of January.

Philadelphia—Specifications for steel bars are good, many buyers taking advantage of expiring fourth quarter prices. Most bar users are under contract for first quarter at 1.65c, Pittsburgh. Mills have abandoned the recent custom of setting March 15 for the final specification date and allow specification to March 31 on steel bars, plates and shapes.

Pittsburgh—First quarter bar contracting is more active. Most buyers of medium tonnages are signing first quarter requirements at 1.65c, Pittsburgh, and although larger users are obtaining protection at 1.60c, producers express satisfaction over the success of the recent $1 advance. Specifications and shipments have declined since early December and little tonnage has been placed for January shipment. Little activity is expected over the remainder of the month.

Cleveland—One of the leading sellers will experience a slight increase in steel bar sales in December over November. Orders generally are currently small and reflect holiday letdowns. Specifications for first quarter have not come out in fullest volume. Mills name 1.60c to 1.65c, Pittsburgh, for that period though consumers of all sized tonnages generally are getting the 1.60c price on orders now placed. Local mills name 1.65c, Cleveland, for both outside and local deliveries.

Cold-Finished Contracts Closed; Prices Unchanged

Cold Finished Prices, Page 61

Pittsburgh — Cold-finished steel bar producers are taking new contracts at unchanged prices of 2.00c to 2.10c. Interest in first quarter tonnage is only moderate and shipments show the usual December letdown. Early 1931 requirements of the automobile industry are rather indefinite and releases for first quarter shipment so far are light.

Cleveland—Releases of cold-finished bar tonnages are slack. The 2.00c to 2.10c base is being applied to first quarter business, which thus far is nominal. Opinions in the trade concur that it was hardly advisable for producers to consider a price advance for first quarter.

Armco Railroad Sales Co., Middletown, O., has been incorporated as a sales organization.

Plates

Makers Holding to New Prices for First Quarter, but Tonnage Is Carried Over at Old Figures

PLATE PRICES, PAGE 61

New York—Practically all plate sellers have opened their books for first quarter at 1.75c, Coatesville, Pa., one large seller having taken this action within the past few days. There has been contracting by some of the larger consumers at 1.70c for first quarter and also current business at this price, but a fair amount of future business is being entered at the new price. The possibility of a further advance around the middle or latter part of January is a firming factor. General demand, while somewhat better, still is far from active and except for the New York Central locomotive award, little in the way of outstanding tonnage is noted. The 50 locomotives for the new York Central will require approximately 2500 tons of plates, of which the greater portion are expected to be placed in the East.

It is expected that 10,000 to 12,000 tons of steel, mainly plates, will be required for the construction of light cruiser No. 37, on which the navy department will open bids in Washington, Feb. 11. The boat is to be built in a private yard.

Philadelphia—Plates are 1.70c to 1.75c, base, Coatesville, Pa., on new business. Leading consumers who have special prices expect to pay 1.70c, minimum, beginning Jan. 1.

Chicago—Plate mills entered the week with operations a little above 50 per cent, but are closing down for the holidays. Practically no contract business has been taken at 1.75c, Chicago, for first quarter and mills are allowing a generous carryover on 1.70c tonnage which cannot conveniently be shipped before the end of the month. Shipments to Milwaukee for pipe line work are furnishing the main support for operations.

Pittsburgh—Better prospects for barge and freight car building give a slightly improved outlook to the plate market for early 1931. Inquiry of the Bessemer & Lake Erie railroad for 1000 to 1200 gondola cars and that of the Inland Waterways Corp. for 50 barges will provide a substantial plate tonnage. Shipments so far this month are off slightly from the November volume. First quarter plate contracting is fair with the general market 1.65c, Pittsburgh, and 1.60c extended to the larger buyers.

Cleveland—Inquiry is dull and orders are extremely small. Consumers hold up deliveries until carloads can be made up, which is in many cases sometimes in January. Firebox, boiler and tank fabricators are inactive. Little forward tonnage is going at

1.65c, Pittsburgh, most consumers getting in fourth quarter contracts at 1.60c. Shipments currently continue slow, though November and December have been about on a par in this respect. Lake repair plate work is lacking for the winter months.

Contracts Placed

3000 tons, cruiser to be built at Mare Island, Calif., to unstated interest.

Contracts Pending

200 tons, tank for Massapequa water district, Long Island, N. Y., W. G. Fritz Co., Orange, N. J., general contractor.

300 tons, sheet piling, landing field, Langley field, Va.; bids opened Jan. 2.

600 tons, highway bridge at Columbus, Mo.

Railroads

New York Central Awards 170,000 Tons of Rails, 50 Engines —Bessemer Wants 1200 Cars

TRACK MATERIAL PRICES, PAGE 61

New York—New York Central has distributed orders for 170,000 tons of rails, 50 per cent for immediate delivery and the remainder for future specification. Bethlehem, Illinois, Inland, Carnegie Steel Companies, Algoma Steel Corp. and Dominion Steel & Coal Corp. shared in this business. Although Bessemer & Lake Erie has entered the market for 1000 to 1200 heavy steel hopper cars, the eastern railroad market is dominated by rail demand. Pennsylvania will close bids Jan. 2 on 150,000 tons, with an option on an additional 50,000. Action also is expected on rails for Central Railroad of New Jersey. Locomotive buying is led by the award of 50 for New York Central.

Philadelphia—Norfolk & Western is inquiring for 2000 tons of plates, shapes and bars, as well as locomotive steel tires and miscellaneous steel requirements for first quarter. Bids close Jan. 6. Atlantic Coast Line is taking prices on its first quarter miscellaneous requirements but is not naming tonnages.

Pennsylvania's rail order for 150,000 tons, which possibly may be expanded to 200,000 tons, if it takes advantage of its option privilege, is not expected to be closed until decision is reached on a special section.

Chicago—New York Central's rail order and Pennsylvania's inquiry constitute major rail market activity. Chicago Great Western closed on 5000 tons and Denver & Rio Grande awarded 10,000 tons. It is pointed out that western railroads are behind on improvements, so 1931 programs should compare favorably with 1930, considering the fact that some rail business is being carried over from 1930. Several roads failed to specify fully against 1930 contracts. Rail mills are operating 40 to 50 per cent. About 7000 to 8000 tons of track fastenings are on inquiry.

Pittsburgh—Freight car activity is enlivened by Bessemer & Lake Erie's inquiry for 1000 to 1200 hopper cars. Part of Pennsylvania's 1931 rail needs is expected here. Baltimore & Ohio, in the market for 7500 kegs of spikes, also is inquiring for tie plates to accompany its rail tonnage. Erie also is taking bids on tie plates, about 4000 tons.

Birmingham, Ala.—While business from railroads is accumulating in a small way, the aggregate is disappointing.

Toronto, Ont.—Canadian Pacific's order for 250 refrigerator cars to National Steel Car Corp., Hamilton, Ont., will involve between $1,250,000 and $1,500,000.

Between $3,000,000 and $4,000,000 worth of business, including 3000 box cars, listed in STEEL of Dec. 11, is to be awarded by Canadian National railways as soon as estimates are approved by the Dominion minister of railways. Three car companies will share in the awards.

Car Orders Placed

Canadian Pacific, 250 refrigerator cars, to National Steel Car Corp. Ltd., Hamilton, Ont., 100 flats to Eastern Car Co., 10 baggage-express cars and underframes for 45 passenger cars, 45 gondolas and 30 air dump cars, to Canadian Car & Foundry So., and 25 tank cars and three snow plows to own shops.

Missouri-Kansas-Texas, 25 cabooses to own shops.

North American Car Corp., Chicago, 50 mechanical refrigerator cars, to own shops.

Locomotives Placed

New York Central, 50 locomotives: 40 to American Locomotive Co., New York, and 10 to Lima Locomotive Works, Lima, O.

Rail Orders Placed

Central Railroad of New Jersey, unstated tonnage, reported gone to Bethlehem Steel Co., Bethlehem, Pa.

Chicago Great Western, 5000 tons of rails; 3000 tons to Illinois Steel Co. and 2000 tons to Inland Steel Co., Chicago.

Denver & Rio Grande, 10,000 tons of rails, to Colorado Fuel & Iron Co., Denver.

Car Orders Pending

Bessemer & Lake Erie, 1000 to 1200 90-ton hopper cars.

Board of Transportation, New York, 26 miscellaneous service cars, contemplated.

Fruit Growers Express, 50 underframes in addition to 20 previously noted.

Illinois Steel Co., 15 ingot cars.

Lehigh Valley, 100 freight cars; action postponed one month.

Rail Orders Pending

Pennsylvania, 150,000 tons with option on additional 50,000 tons; bids opened Jan. 2.

Locomotives Pending

Chicago, Milwaukee, St. Paul & Pacific, 57 locomotives; action postponed one month.

New York Central, 170,000 tons of rails; half for immediate delivery; remainder for future specification, allocated as follows: 71,500 tons to Bethlehem Steel Co., Bethlehem, Pa.; 62,600 tons, to Illinois Steel Co., Chicago; 13,900 tons, to Inland Steel Co., Chicago; 11,380 tons, to Carnegie Steel Co., Pittsburgh; 8620 tons, to Algoma Steel Corp., Sault Ste. Marie, Ont., and 2000 tons, to Dominion Steel & Coal Corp., Montreal.

Sheet Bars, Billets, Slabs, Now General at $30

Semifinished Prices, Page 72

Pittsburgh — Semifinished steel continues in a rather nominal market due to the lack of new buying. Several contracts for forging billets have been entered at $36 but buyers of rerolling material as yet are not interested in forward tonnages. Shipments hold at the slow pace of finishing mill operations. Wire rods continue $35 with rerolling billets, slabs, and sheet bars $30 to $31.

Philadelphia — The majority of first quarter billet requirements are pending. Rerollers are $31, Pittsburgh, and forging quality $36.

Cleveland—The general price on sheet bars, billets and slabs for first quarter now is $30, Cleveland and Youngstown, $1 a ton less than formerly. While $30 has been done, as reported, for some weeks books were not officially opened at that level.

Youngstown, O.—New business in billets, sheet bars and slabs is insufficient to clarify the first quarter price. Small lots are bringing $31, Youngstown and Pittsburgh, for delivery this year. Whether the mills here will follow Cleveland district producers by going to $30 still is to be determined.

Structural Shapes

Lettings Lower, Topped by 8000-Ton Bank in Philadelphia—Inquiry Active, Particularly in Chicago Where 80,000 Tons Is Either Alive or in Early Prospect

STRUCTURAL SHAPE PRICES, PAGE 61

New York—Two jobs, a subway and a penitentiary, account for 14,000 tons of structural steel just placed here. Engineering projects are being placed with less delay than several months ago. Fresh inquiry is lighter, but pending tonnage on which figures have been taken remains heavy. Prices are steadier around 1.885c, delivered, New York, but it has been difficult to establish the latest mill advance. That action, however, did steady the market at 1.60c, Pittsburgh, on attractive tonnages on late quarter business.

No action was taken Dec. 19 on the award of the general contract for the 15,000-ton third section of the West Side elevated highway. James Stewart & Co., as noted in STEEL of Dec. 11, were recommended for the work by New York Central. The board of estimate is expected to pass on it Jan. 16.

Boston—Only about 250 tons of structural work was figured here last week. The remainder of the year will be quiet. Coast guard buildings at New London, Conn., will take 500 tons additional.

Philadelphia—Leading shape mills continue to follow a strong price policy. New business is quoted 1.70c to 1.75c, base, eastern mill, for plain standard shapes. On some old projects old protections have been extended to the end of the year.

Pittsburgh—Shipments of plain structural material show less than the usual December decrease but are expected to be lighter over the remainder of the month. First quarter contracting is fairly active with 1.65c, Pittsburgh, quoted to average buyers and 1.60c to large users. Inquiry is quiet and few large awards are noted.

Buffalo—A local fabricator booked 100 tons of shapes for Utica, N. Y., high school. The award of 2200 tons for the Lackawanna, N. Y., viaduct is expected this week. Little if any other tonnage is pending for immediate coverage.

Cleveland — Structural shape awards are scarce and new inquiries are few. Early action is expected on the mill building to house the continuous sheet mill for Otis Steel Co., contract for which went to United Engineering & Foundry Co. and Mackintosh-Hemphill Co. A building for the Yoder Co. will be closed this week. A building for Young Men's Hebrew association, Rochester, N. Y., was let to F. L. Hughes & Co., Rochester, 600 tons. The city will not reach until January the matter of bridges at West Second and Third streets, to hook up with the civic stadium. Little or no contracting for plain material is reported by mills, and specifications have declined during the past week but are expected to pick up after Jan. 1. The market is quoted 1.60c to 1.65c, Pittsburgh, with efforts being made to establish the maximum figure as minimum for first quarter. Outside mills quoting 1.60c, Pittsburgh, for that quarter are reported unsuccessful in booking business. Bids closed Dec. 23 for the second time on the state highway bridge at Painesville, O., 350 tons.

Chicago—Structural engineers and fabricators are working on about 40,000 tons of active building, while 40,000 to 50,000 tons more is expected on inquiry soon. Early start on the Illinois waterway link of the Lakes-to-Gulf channel is held likely through enactment of the emergency construction bill by congress last week. More than 30,000 tons of steel will be required eventually, including 12 bridges, as a part of this state's contribution to the project. Wabash railroad is expected to inquire for 17,700 tons for a bridge over Missouri river, at St. Charles, Mo. A number of carried over 90-day contracts for plain material are noted at 1.70c, but practically no contracting at 1.75c, Chicago, for first quarter has been arranged. A utility company is inquiring for 1000 tons for transmission towers in Texas and Wisconsin.

Birmingham, Ala. — Most shape contracts reported are small. Virginia Bridge & Iron Co. was awarded 1000 tons for a highway bridge in Philippine islands. Operations will continue except for two to three days for the holidays. Bids are out on several contracts and fabricators anticipate better business in early 1931.

Awards Compared

	Tons
Awards this week	**36,021**
Awards last week	**37,007**
Awards two weeks ago	**18,816**
Awards this week in 1929	**57,115**
Av. weekly awards, 1930	**35,242**
Av. weekly awards, 1929	**42,213**
Av. weekly awards, Nov.	**33,202**
Tot. awards to date, 1929	**2,195,093**
Tot. awards to date, 1930	**1,832,601**

Contracts Placed

8000 tons, building, Philadelphia Savings bank, Philadelphia, to American Bridge Co., Pittsburgh; George A. Fuller Co., New York, builder.

7500 tons, subway, route 107, section 9, Brooklyn, N. Y., to American Bridge Co., Pittsburgh.

6500 tons, penitentiary, Riker's island, East river, New York, to National Bridge Works, Long Island City, N. Y.; P. J. Carlin Construction Co., general contractor.

2500 tons, Illinois-Indiana highway bridge over Wabash river at Mt. Carmel, Ill., awarded this week to Vincennes Bridge Co., Vincennes, Ind., at $399,413.

2400 tons, approaches for Ohio river bridge, Evansville, Ind., to R. C. Mahon Co., Detroit; listed in STEEL of Nov. 20, as going to McClintic-Marshall Co., Pittsburgh.

1500 tons, frames, spillway, dam gates and miscellaneous shapes for Ariel dam project, Northwestern Electric Co., Lewis River, Wash., to Willamette Iron & Steel Works, and Poole & McConigle Inc., Portland, Oreg.

1100 tons, continuation school, East 151st street through to East 152nd street, west of Courtland avenue, Bronx, N. Y., to Harris Structural Steel Co.

1000 tons, highway bridge in the Philippine islands, to Virginia Bridge & Iron Co., Birmingham, Ala.

750 tons, office building alterations and addition, Syracuse, N. Y., to American Bridge Co., Pittsburgh; Starrett Bros. & Eken Inc., New York, general contractors.

700 tons, Verdie junior high school, Chicago, to Wendnagel & Co., Chicago.

650 tons, inspection shed, board of transportation, Bronx yards, New York, to Hedden Iron Construction Co., New York; John T. Brady & Co., general contractor.

600 tons, third section, construction bridge, Safe Harbor, Pa., to McClintic-Marshall Co., Pittsburgh; Arundel Corp., builder.

600 tons, building, Young Men's Hebrew association, Rochester, N. Y., to F. L. Hughes Co., Rochester.

500 tons, mill building for Blandin Paper Co., Grand Rapids, Minn., to Minneapolis-Moline Power Implement Co., Minneapolis.

500 tons, telephone building, Bronx, N. Y., to Hedden Iron Construction Co., New York.

400 tons, Isthmus bridge, Marshfield, Oreg., to unstated fabricators through Liesch & Tofte, Marshfield, general contractors.

350 tons, building, Wrought Washer Mfg. Co., Milwaukee, to Milwaukee Structural Steel Co., Milwaukee.

300 tons, highway bridge at Berlin, Wis., to Worden-Allen Co., Milwaukee.
300 tons, court house, Ogden, Utah, to Denver Iron & Steel Co., Denver.
280 tons, highway bridge at Domingo, Mex., to American Bridge Co., Chicago.
200 tons, apartment, Sacramento and Gough streets, San Francisco, to Golden Gate Iron Works, San Francisco.
185 tons, building, Vulcan Detinning Co., Sewaren, N. J., to Levering & Garrigues Co., New York; Wigton Abbot, general contractor.
160 tons, service station, Allied Engineers Inc., Lansing, Mich., to Flint Structural Steel Co., Flint, Mich.
150 tons or more, civic theater, Kalamazoo, Mich., to R. C. Mahon Co., Detroit.
150 tons, apartment, Camden, N. J., to Kalman Steel Co., Chicago.
131 tons, Jewish home, Providence, R. I., to Providence Steel & Iron Co.
125 tons, studio, First National Pictures Corp., Burbank, Calif., to Minneapolis-Moline Power & Implement Co., Minneapolis.
120 tons, canopy, Portland Terminal Co., Portland, Me., to Boston Bridge Works Inc., Boston.
110 tons, bridge, Pennsylvania railroad, Dewart, Pa., to McClintic-Marshall Co., Pittsburgh.
110 tons, navy yard building, Philadelphia, to Shoemaker Bridge Co., Pottstown, Pa.
100 tons, high school, Utica, N. Y., to Kellogg Structural Steel Co., Buffalo.
100 tons, Little Klickitat river bridge, Washington, to Pacific Iron Works, Portland, Oreg.
100 tons, miscellaneous work in Seattle territory, to Wallace Bridge & Structural Steel Co., Seattle.
100 tons, residence at Goshen, N. Y., to Jones & Laughlin Steel Corp., Pittsburgh.
100 tons, highway bridge, Kanona, N. Y., for Delaware, Lackawanna & Western railroad, to American Bridge Co., Pittsburgh.

Contracts Pending

17,700 tons, bridge over Missouri river, St. Charles, Mo., for Wabash railroad; inquiry expected.
14,000 tons, estimated, two mill buildings, Inland Steel Co., Indiana Harbor, Ind.
6500 tons, 56 government hangars; bids to be advertised in February.
5000 tons, 21-story St. Louis Mart building, St. Louis Terminal Railway association, St. Louis; general contract awarded Gamble Construction Co., St. Louis.
4100 tons, Louisiana capitol building, New Orleans; bids in.
1900 tons, State bridge at Kittaning, Pa.; McClintic-Marshall Co., Pittsburgh, low bidder.
1000 tons, transmission towers for utility interest in Texas and Wisconsin.
500 tons, coast guard station buildings, New London, Conn.
350 tons, Clinton prison, Dannemorra, N. Y.
300 tons, state highway bridge, Painesville, O.; second set of bids went in Dec. 23.
300 tons, building, Yoder Co., Cleveland; bids in; general contract may be let this week.
200 tons, also 100 tons of sheet piling, Wright Memorial, Kitty Hawk, N. C.; W. P. Thurston & Co., or Wills & Mafera Corp., low bidders.
200 tons, two bridges for Cleveland to connect West Second and Third streets with civic stadium; due for attention after Jan. 1.
200 tons, state highway bridge, Indiana county, Pennsylvania; Welsh Construction Co., Pittsburgh, low.
150 tons, highway bridge, Maryland.
140 tons, bridge, Pennsylvania railroad, McKeesport, Pa.; McClintic-Marshall Co., Pittsburgh, low.
100 tons, highway bridge in Alabama.
Unstated tonnage, $500,000 continuation school, East Ferry street, Buffalo; board of education having plans drawn.
Unstated tonnage, building for continuous sheet mill, Otis Steel Co., Cleveland; preliminary plans submitted.

Concrete Bars

Another Comparatively Quiet Week in Awards—Inquiry Rate Expands, Chicago Having About 5000 Tons in Prospect—Bridge Takes 3000 Tons

REINFORCING BAR PRICES, PAGE 61

Chicago—While reinforcing bar awards are light, from 3000 to 5000 tons are reaching an active stage. Bids on the general contract for the Ogden avenue viaduct, Chicago, have been received, 3000 tons. Minnesota shortly will want about 1000 tons of road work bars. Illinois highway commission takes bids Jan. 12 on 500 to 1000 tons. Billet bars are nominal at 1.70c to 1.80c.

New York—Concrete reinforcing bar prices are firm at unchanged levels. The bulk of tonnage is largely confined to public work. Pending private construction is low. Subway and engineering work up is estimated at close to 10,000 tons. Three warehouses and *New York Telegram* building will take more than 1000 tons.

Philadelphia—Concrete bars are more active, several tonnages being placed and additional ones up for early action. Cut lengths, mill shipments in carloads, are quoted 1.70c, to 1.85c, Pittsburgh.

Buffalo—Reinforcing bar sales and inquiries both neared the vanishing point this week. Sellers expect a quiet market until 1931.

Birmingham, Ala.—Concrete bar orders still come in although tonnages are small. Connors Steel Co. was awarded 150 tons at Spartanburg, S. C. This company's plant will close down for a brief time over holidays, possibly a week. Shipments, however, will continue without interruption except for one or two days. Prospects are bright with several contracts being bid upon.

Pittsburgh—Concrete reinforcing bar demand is lighter, reflecting year-end conditions. Large lots are lacking in both awards and inquiry in this district and pending tonnage usually calls for small lots. Prices are steady.

Awards Compared

	Tons
Awards this week	3,342
Awards last week	2,915
Awards two weeks ago	4,350
Awards this week in 1929	3,457
Av. weekly awards, 1929	5,849
Av. weekly awards, 1930	6,990
Average weekly awards, Nov.	8,752
Total awards to date, 1929	304,166
Total awards to date, 1930	363,479

Contracts Placed

800 tons, pier No. 23, San Francisco, to Stoule Steel Co., San Francisco.
700 tons, 6-story building, Attica Film Corp., 521 Forty-third street near Eleventh avenue, New York, to Jones & Laughlin Steel Corp., Pittsburgh; Turner Construction Co., New York, general contractor.
425 tons, building, Philadelphia Storage Battery Co., Philadelphia, to Concrete Steel Co., New York; William Steel & Sons, contractors.
250 tons, hospital, Agnew, Calif., to Concrete Engineering Co., San Francisco.
205 tons, bridge over Wabash river at Mt. Carmel, Ill., to Vincennes Bridge Co., Vincennes, Ind.
200 tons, theater, Wilshire and Western avenues, Los Angeles, to unstated interest.
200 tons, Immaculate Conception shrine, Washington, to Concrete Steel Co., New York; McCloskey & Co., contractors.
150 tons, Pretty Boy dam, Parkton, Md., to Concrete Steel Co., New York; Laporte Corp., Albany, N. Y., general contractor.
150 tons, for Spartanburg, S. C., to Conners Steel Co., Birmingham, Ala.
137 tons, warehouse, Harrison street, San Francisco, to Truscon Steel Co., San Francisco.
125 tons, tubercular ward, General hospital, Philadelphia, to Milton Mfg. Co., Philadelphia; Wark Co., Philadelphia, general contractor.

Contracts Pending

3000 tons, Ogden avenue viaduct, Chicago; bids in on general contract.
645 tons, bridge on Benson-Vail highway, Phoenix, Ariz.; bids opened.
600 tons, subway, route 108, section 9, Queens, N. Y., reported placed last

(*Concluded on Page* 69)

Strip

Better Specifications Met in Some Branches—First Quarter Contracts Being Made

STRIP PRICES, PAGE 61

Pittsburgh—Strip steel specifications are declining, but December tonnage to date shows little change from that of a month ago. A fair number of first quarter contracts have been placed with prices usually 1.55c and 1.65c, Pittsburgh, on hot strip and 2.25c to 2.35c for cold-rolled strip. Hot mill operations average around 30 per cent but will be lower over the end of the week, due to holiday interference.

New York—Hot strip prices are unchanged at 1.55c, Pittsburgh, for wide and 1.65c, for narrow. Cold-rolled strip is 2.25c, Pittsburgh. Trading continues quiet.

Philadelphia — Specifications for steel strip are somewhat improved, both for the remainder of this month and for January. Prices continue unchanged at current levels.

Youngstown, O. — First quarter tonnage in hot and cold-rolled strip steel is beginning to be placed in encouraging volume, coming from a variety of users. While local strip mill operations, as is the case also with sheets, has sunk this week to the minimum, with some plants down for the holiday week, yet mill operators seek an improvement in operations after inventory and holiday season. New business being placed now is at reaffirmed first quarter prices.

Cleveland—Some cold strip users have been specifying actively. Strip for automobile purposes is in poor demand, most shipments being held up until after holidays and inventories. First quarter bookings are rare, few caring to anticipate. Cold strip is 2.25c to 2.35c, Cleveland. Wide hot strip usually is 1.55c, Pittsburgh, and narrow, 1.65c. Several hot strip producers follow new annealing and normalizing extras, 40 cents instead of 25 cents for annealing and 25 cents instead of 15 cents for normalizing. These apply on all strip sizes, but not on blue annealed over 24 inches.

Chicago—Cold-rolled strip mills are obtaining a fairly even flow of business and are operating at about 30 per cent. Prices are reported steadier for cold-rolled than in the last 18 months. First quarter contracting is on the basis of 2.25c to 2.35c, Pittsburgh-Cleveland.

Warehouse Sales Below Normal, Even for Season

Warehouse Prices, Page 83

New York—Warehouse buying is seasonally dull, with jobbers looking for little improvement over the next two weeks. Meanwhile, prices are unchanged, and in some instances virtually nominal.

Philadelphia — Jobbers report somewhat better bookings with December sales running above November's.

Pittsburgh—Little additional decline is noted from earlier in December and for some interests sales approximate November volume. Plates and shapes are in fair demand. Bars continue dull. Sheets remain quiet. Prices are unchanged.

Cleveland—With the approach of year-end inventory period, shipments of iron and steel from warehouses have dropped to the lowest point of the year. In addition, manufacturers have further curtailed operations. Prices continue unchanged and firm.

Chicago—Warehouse sales are much below normal even for this season. A few jobbers have named new width extras on black sheets, applying chiefly to widths of 40 inches and over, in line with similar action by eastern jobbers.

Cincinnati—The dull market for warehouse materials has become increased with the approach of holidays. Prices continue unchanged.

St. Louis—Distributors from stock report no change in dull conditions. Orders are few and are for unusually small amounts.

General manufacturing has developed no larger demands. Demand from the south is the lightest in several decades. Bars, plates, sheets and shapes continue quiet, and wire products are reported by two leading jobbers as the smallest this year.

Operations Slide; Holiday Reduces Week Averages

Youngstown, O.—Operations' average is 23 per cent of capacity compared with 40 per cent last week, a decline of 17 points. Newton Steel Co. lifted operations to 60 per cent of capacity, compared with 50 last week. Otherwise, steel manufacturers show losses or maintained unchanged schedules. All Republic Steel Corp. plants in this district are idle. Sheet & Tube again operates at 35 per cent, while a 15 point decline at Carnegie plants here brings its average down to 35 per cent. Sharon Steel Hoop Co. activity dropped to 30 per cent, against 57 last week, due to temporary suspension of strip mills at Sharon, Pa., and sheet operations in its Youngstown mills. While Empire Steel Corp. made no change in its idle schedules for three plants in this district, the Cleveland plant was scheduled to start after an inactive period of many months.

Philadelphia—Eastern mills which expected a shutdown this week are, with only one exception, operating due to numerous urgent specifications for early shipment. Current demand from plate, sheet and shape mills represents considerable improvement over October and November. Ingot production is now 30 to 35 per cent capacity but after the holidays will go back to at least 38 per cent.

Buffalo—Buffalo steelworks unexpectedly increased their output Dec. 22 to 30 per cent of open-hearth capacity, a gain from the 24 per cent rate which had prevailed for two weeks previously. It is expected this will be offset by holiday curtailments, however, and that the average for the last half of the month will not be much in excess of 20 per cent.

Pittsburgh—Ingot production is curtailed this week by holiday shutdowns and averages no higher than 25 to 30 per cent. Finishing mill schedules also will be curtailed, with sheets and tin plate at about half the recent averages of 35 to 40 and 50 to 55 per cent, respectively. Strip oeprations average around 20 per cent with pipe at 25 to 30.

Cleveland—For the third consecutive week district average of 48 per cent open-hearth capacity is maintained, each of the individual producers likewise unchanged. Sixteen of 34 open hearths are pouring, with a shutdown scheduled over Christmas day at most plants.

Chicago—Operating rates have been reduced to 30 to 35 per cent. Most departments closed Dec. 24 until Dec. 29. Steelworks blast furnace operations are unchanged with 14 of the district's 36 active. The leading interest will continue some production at South Chicago through the holiday period.

Birmingham, Ala.—Steel mill operations are under 40 per cent capacity. Nine of 23 open-hearth furnaces are in operation.

Concrete Bars

(*Concluded from Page 65*)

week with Igoe Bros., Newark, N. J.; sill ptending; Arthur A. Johnson Corp. is general contractor.

500 to 1000 tons, Illinois road work; bids Jan. 12.

500 tons, eastern penitentiary, Philadelphia; bids Dec. 30.

290 tons, warehouse, South street, New York.

200 tons, James Ford Rhodes high school, Cleveland; John Grant & Son, low bidders on general contract, not yet in receipt of award.

159 tons, paving work in Santa Barbara county, Sacramento, Calif.; bids opened.

Auto Value Up One-Third; Materials Cost 2½ Billion

Total value of motor vehicles and trailers shipped or delivered in 1929 by establishments engaged primarily in their manufacture amounted to $3,415,636,810, according to the bureau of the census from data collected by the census of manufactures in 1930. This is an increase of 34 per cent from $2,546,807,058 reported for 1927, the last census year. Other comparisons follow:

	1929	1927
Number companies	242	264
Wage earners (Yr. ave.)	225.583	187,910
Wages	$365,660,895	$321,664,093
Materials cost	$2,398,318,091	$1,889,426,249
Products value:		
Autos, trailers	$3,415,636,810	$2,546,807,058
Other products	$302,359,743	$301,635,785
Total	$3,717,996,553	$2,848,442,843
Value added by manufacture	$1,319,678,462	$959,016,594

Manganese Is Dissolved From Ore by Waste Gas

Sulphur dioxide may be the means of future utilization of large deposits of low-grade domestic manganese ores, according to the bureau of mines, Washington. Three progress reports on a study of the hydrometallurgy of manganese, bearing on different phases of the problem, have been prepared by the bureau's rare and precious metals experiment station, Reno, Nev., in co-operation with the University of Nevada.

One of these progress reports involves the dissolution of manganese from ores. Sulphur dioxide gas, a waste product at many smelters, passing counter current to pulp flow in a specially designed leaching drum, readily dissolves the manganese from the principal oxides and also from the carbonates after calcination.

Another report records a study of the oxidation of hydrated oxides of manganese, the object being the production of maximum percentage of the dioxide of manganese. A third report deals with sulphur dioxide and manganese oxides at elevated temperatures. There is now in course of preparation an article on the recovery of manganese from its solution for metallurgical uses.

Iowa coals, their uses, and the results which may be expected from them are presented in a booklet of the engineering experiment station of Iowa State college, Ames, Ia., entitled "Burning Pulverized Iowa Coal," by Earl B. Smith.

Pipe

Six Cast Awards Total 22,000 Tons—Several Lots Pend —Steel Pipe Bought in West

PIPE PRICES, PAGE 83

Chicago—Scattered winter buying of cast pressure pipe by several municipalities in the North Central and Mississippi valley states is occurring. Milwaukee is tabulating bids on 6000 tons of 8, 12 and 16-inch pipe, special fittings and castings. Saginaw, Mich., took bids the first of the week for 555 tons of 6 to 24-inch cast pipe and 20 tons of fittings. Clarkton, Mo., closed on 350 tons of 2 to 8-inch cast. The 11,000 tons of large-size cast pipe for Detroit has been distributed among the low domestic bidders. Chicago delivered prices for private work are steady at $45.20 to $46.20 for the larger diameters.

Boston—Cast pipe producers sold a fair tonnage to private interests. Prices still are firm. Bids close on about 3600 tons before the end of the year. Providence and Pawtucket, R. I., want 1700 and 1400 tons, respectively.

New York—Pending inquiry for cast pipe is heavier. Utilities are more active. Two closed on between 2000 and 3000 tons, one located at Baltimore. Philadelphia also is reported to have bought about 1500 tons. Almost 3000 tons are up for the Massapequa water district. Two small state jobs and some municipal work are also up in New York. Prices incline easier with $35 to $37, eastern foundry, noted. More business has been placed at the inside figure.

Buffalo—Municipalities are in the market for some good sized lots of pipe for late winter and early spring projects. Erie, Pa., and Syracuse, N. Y., purchased 1500 and 450 tons respectively. Several other fairly large lots are pending.

Pittsburgh—Demand for lapweld and buttweld pipe continues at the lowest level of the year. Activity in boiler tubes and tubing is light but little changed since early December. Oil country goods move slowly and little new activity has developed in line pipe although prospective lines for 1931 are being discussed. Pipe mill operations reflect seasonal influences and currently average around 25 to 30 per cent.

Cleveland — Jobbers intent on maintaining low stocks of pipe at least until early 1931 are not buying any more than they have to have. Pipe, conduit, etc., for the Higbee Co. department store building, is reported divided between Pittsburgh and Youngstown, O., interests. No other large tonnage is up locally.

Birmingham, Ala.—Numerous cast pipe lettings are sufficient to improve backlogs. Unemployment relief in some sections is bringing purchases. All shops participate in the distribution of orders. Production will be steady after resumptions Dec. 29 or a little later. Base price is unchanged.

New Orleans, La.—United States Pipe & Foundry Co. was awarded 3116 tons of 24, 30 and 48-inch class B cast pipe with fittings by the sewerage and water board. Most of the fittings are bell and spigot type.

Contracts Placed

11,000 tons, 24 to 36-inch cast pipe for Detroit; divided among low bidders, Glamorgan Pipe & Foundry Co., Lynchburg, Va., James B. Clow & Sons, Chicago, and Lynchburg Foundry Co., Lynchburg, at an average delivered price of approximately $39.50.

3116 tons, 24, 30 and 48-inch class B cast pipe and fittings, for sewerage and water board, New Orleans, on contract 109-S to United States Pipe & Foundry Co., Birmingham, Ala.

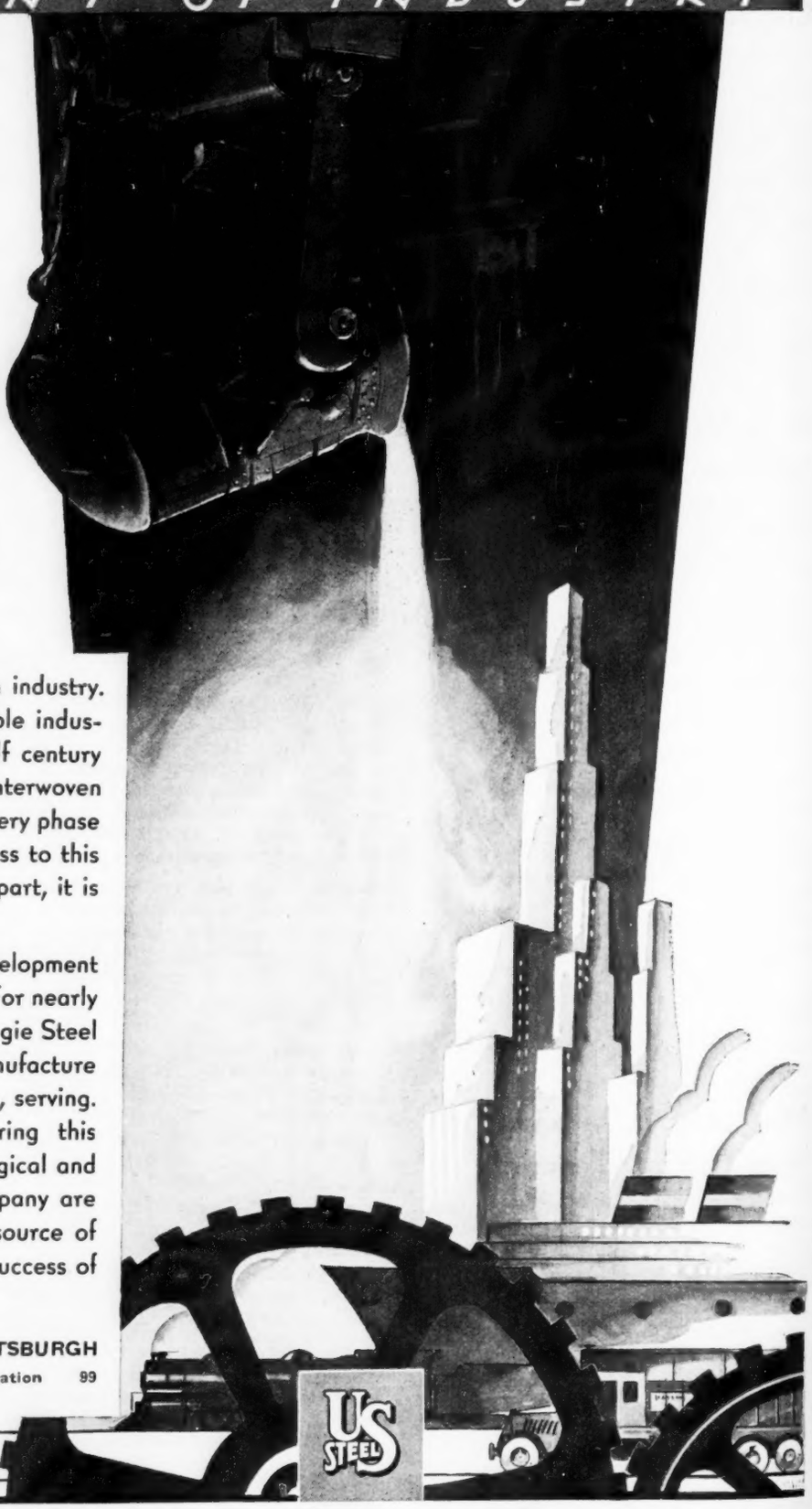
3000 tons, 6, 8 and 12-inch cast water pipe for Inkster, Mich., 2000 tons, to American Cast Iron Pipe Co., Birmingham, Ala., and 1000 tons to Central Foundry Co., Holt, Ala.

2000 tons, cast pipe, for Marrero, La., to National Cast Iron Pipe Co., Birmingham, Ala.

1500 tons, 6 to 12-inch cast pipe with

STEEL

SERVANT OF INDUSTRY



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CARNEGIE STEEL COMPANY - PITTSBURGH

Subsidiary of United States Steel Corporation 99

CARNEGIE

fittings, for Philadelphia, to unstated foundry.

1500 tons, cast water pipe for Erie, Pa., to United States Pipe & Foundry Co., East Burlington, N. J.

927 tons, cast pipe for San Francisco: 381 tons 6 inch class 150, to American Cast Iron Pipe Co., Birmingham; 273 tons each 8 inch class 150 to United States Pipe & Foundry Co., East Burlington, N. J., and National Cast Iron Pipe Co., Birmingham.

540 tons, 20 to 30 inch class B and D cast pipe for Glendale, Calif., to National Cast Iron Pipe Co., Birmingham, Ala.

600 tons, cast pipe for Glendale, Calif., to National Cast Iron Pipe Co., Birmingham, Ala.

500 tons, 6 and 8-inch cast pipe for Woodcliffe Lakes, N. J., to R. D. Wood & Co., Florence, N. J.

450 tons, cast water pipe for Syracuse, N. Y., to R. D. Wood & Co., Florence, N. J.

350 tons, 2 to 8-inch cast pipe for Clarkton, Mo., to unstated foundry.

175 tons, cast water pipe for The Dalles, Oreg., to Pacific States Cast Iron Pipe Co., Provo, Utah.

170 tons, 3 to 12-inch cast pipe for Credemore state hospital, New York, to United States Pipe & Foundry Co., East Burlington, N. J.; Oak Hill Contracting Co., general contractor.

165 tons, 6 to 12-inch cast pipe for Wassaic hospital, New York, to United States Pipe & Foundry Co., East Burlington, N. J.

135 tons, 2-inch cast pipe for Long Beach, Calif., to Grinnell Co. Inc., Providence, R. I.

125 tons, 24-inch cast pipe for Hudson, N. Y., to United States Pipe & Foundry Co., East Burlington, N. J.

Contracts Pending

6000 tons, cast pipe for Milwaukee as listed last week; bids being tabulated.

3000 tons, 30 miles of 6 to 12-inch cast pipe for Massapequa water district, Long Island, N. Y., including 20 miles or more of 6-inch; general contract bids in.

1700 tons, various sizes, cast pipe for Providence, R. I.; bids Dec. 29.

1400 tons, 4 to 20-inch cast pipe for Pawtucket, R. I.; bids close Dec. 23.

1238 tons, 6 to 20-inch class B or 150 cast pipe, East Bay Municipal Utility District, Oakland, Calif.; bids Jan. 3.

555 tons, 6 to 24-inch cast pipe and 20 tons of fittings for Saginaw, Mich.; bids opened Dec. 22.

350 tons, 6 to 12-inch cast pipe for New Bedford, Mass.; bids close Dec. 19.

280 tons, cast pipe for department of water supply, gas and electricity, New York; bids Jan. 2.

150 tons, 6 to 12-inch cast pipe for Lawrence, Mass.

Unstated tonnage, approximately one mile of cast pipe, New York department of water supply; bids Jan. 16; also 5700 tons of steel pipe.

Steel Pipe Orders

4855 tons, 3 to 12-inch lapwelded, ball and spigot steel pipe for Brighouse, B. C., to Page Hersey Tubes Ltd., Toronto, Ont.

700 tons additional, for 38 and 51-inch welded steel pipe line, Los Angeles, to Western Pipe & Steel Co., Los Angeles.

Steel Pipe Pending

5700 tons, 36 and 48-inch steel pipe, New York department of water supply; bids Jan. 6; also one mile of cast pipe.

Wire

Steady, Moderate Business Comes from Jobbers—Dealer Sales Low—New Cut Nail Base

WIRE PRICES, PAGE 61

Chicago—Wire goods specifications show no perceptible change. Mills are seeking to induce jobbers to lay in stocks for expected heavier demand in January, and for spring shipment. Dealer sales are light. Mill stocks of all common wire products are well balanced. Some first quarter contracts for nails have been signed on the basis of $1.95 to $2.05, Chicago or western mills.

Worcester, Mass.—Little change is noticeable in the wire market. The diversity of lines turned out in local plants keeps production even. First quarter specifications, however, show no great hope for advance. Prices remain at 2.40c, base Worcester, for plain bright wire to dealers.

New York—Manufacturers of wire nails report improved buying to replenish jobber stocks. Shading of $1.90, Pittsburgh, has virtually disappeared and $2 is holding fairly well. Plain bright wire is generally at 2.20c, Pittsburgh, although 2.30c is still being done in some special cases.

Manufacturers of cut nails have established quotations on a Pittsburgh basis, now quoting $2.40 per 100 pounds in carloads; $2.65 in less than carload lots, five kegs or over; and $2.80 in less than 5-keg lots. Previously, the market was on an f.o.b. mill basis, with sellers quoting $2.45 per 100 pounds in carload lots and $2.55 in less than carload lots. The change was made in the interest of greater market stability, according to leading sellers.

Pittsburgh — Shipments of wire products have been fairly well sustained so far this month but are commencing to decline. Sentiment has improved and prices are showing stability at $1.90 and $2 for wire nails, 2.20c to 2.30c for plain wire and $35 for wire rods. Improved shipments are looked for in January although releases for that month are only moderate. Light demand is in prospect from automotive users.

Cleveland—A few blanket orders are being placed for first quarter, though producers feel the most severe test of wire prices will come late in January. Orders currently are small on plain wire at 2.20c to 2.30c, with most tonnage now going at the former figure. There has been some recent interest on wire among several cap screw manufacturers. Nails are $1.90 to jobbers and $2 to the general trade.

Nut, Bolt, Rivet Demand Holds at Steady Rate

Bolts, Nuts, Rivets Prices, Page 61

Pittsburgh — Specifications for bolts, nuts and rivets are steady and December business shows a slight increase over the corresponding November period. Orders are in small lots, without the usual December decrease. First quarter contracting is nearly completed with the market steady at 73 off for bolts and nuts and 2.75c, Pittsburgh, for large rivets.

New York—Demand for bolts and nuts is slack with eastern mills operating under 35 per cent. Jobber stocks are the lightest in years.

Chicago—Buyers of nuts, bolts and rivets have closed for first quarter business on about normal commitments. Specifications this month are 10 to 15 per cent above November, due to recent automotive releases in this territory and numerous scattered orders from implement buyers. Implement works' schedules largely are on a part time basis, some of the production being to relieve unemployment. Large structural rivets remain nominal at 2.85c, Chicago.

Tin Plate 1931 Tonnage Expected on 1930 Par

Tin Plate Prices, Page 61

Pittsburgh—Tin plate production which has been rising steadily for the past several weeks will be reduced by mill shutdowns during half of this week. The recent average has been 50 to 55 per cent. Contracting for the first half of 1931 is nearly completed and requirements of the leading consumers are expected to approximate those of the 1930 tonnage. The market continues $5, Pittsburgh, per base box.

Youngstown, O.—Tin plate mills in eastern Ohio are resuming on a moderate scale as usual at this time. Plate is being rolled in anticipation of the heavy spring demand from canmakers and other users. Orders are being placed at $5 per 100 pounds, Pittsburgh.

Raw Material Prices

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago, furnace	$17.50
Pittsburgh, district fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Valley, furnace	17.00
Cleveland fur., local del.	17.50
Philadelphia, delivered	17.76
Virginia, furnace	17.75
Granite City, Ill., fur.	17.50
Buffalo, fur., local del.	17.50
Buffalo, del. Boston	21.41 to 21.91
Buff., all-rail, Brooklyn	20.41 to 20.91
Buff., all-rail, Newark	18.28 to 18.78
Ala., Bir. fur., local del.	14.00
Alabama, del. Chicago	16.51 to 17.01
Alabama, del. St. Louis	14.42 to 15.42
Alabama, del. Cincinnati	14.69 to 16.19
Alabama, del. Cleveland	16.51 to 17.51
Ala., Phila., dock del.	16.25
Ala., Balt., dock del.	16.00
Alabama, New York dock	16.00 to 16.50
Ala., Boston dock del.	16.25 to 16.75
Tenn., Bir. base, local del.	14.00
Tennessee, del. Cinn.	14.69 to 16.69
Montreal, delivered	23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	18.00
Buff., all-rail, Brooklyn	20.91 to 21.41
Buffalo, all-rail Newark	18.78 to 19.28
Buffalo, del. Boston	21.91 to 22.41
Virginia furnace	18.25
Eastern, del. Phila.	18.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	19.00
Eastern, del. Phila.	19.26 to 19.76

MALLEABLE

Chicago, furnace	17.50
Cleveland fur., local del.	17.50
Pittsburgh district fur.	18.00
Pittsburgh, delivered	18.63 to 19.13
Valley furnace	17.50
Buffalo fur., local del.	18.00
Eastern Penna., delivered	18.26 to 20.91
Granite City, Ill., fur.	17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Eastern Penn., del.	17.50 to 18.00
Buffalo fur., local del.	17.00
Montreal, delivered	20.50
Valley furnace	17.00

BESSEMER

Valley furnace	17.50
Pittsburgh, delivered	18.63 to 19.13
Pittsburgh, furnace	18.00

LOW PHOS.

Valley fur., standard	27.00
Philadelphia, standard	24.76 to 28.79
Copper-bear., E. Pa. fur.	22.50 to 23.00

GRAY FORGE

Valley furnace	16.50
Pittsburgh district fur.	17.00
Pittsburgh, delivered	17.63 to 18.13

CHARCOAL

Lake Superior, del. Chicago	27.04

SILVERY

Jackson County, O., fur., in per cents 6—$21; 7—$21.50; 8—$22; 9—$22.50; 10—$23; 11—$24; 12—$25; 13—$27.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents 10—$25; 11—$26; 12—$27; 13—$29; 14 $31; 15—$33; 16—$35.

Coke

Prices Per Net Tons

Beehive Ovens

Connellsville furnace	$2.50 to 2.60
Connellsville foundry	3.50 to 4.85
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	$9.00 to 9.40
Chicago ovens	8.00
New England, del.	11.00
St. Louis, del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell. basis	5.50
Portsmouth, O., ovens, Connell. basis	5.50
Buffalo ovens	8.00 to 8.50
Detroit, ovens	8.50
Philadelphia, del.	9.00

Iron Ore

LAKE SUPERIOR ORE

Gross Ton, 51½%, Lower Lake Ports

Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56 63%, contract	10.00
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% manganese	11.00
North African low phosphorus	10.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish, North African basic, 50 to 60%	9.00
Newfoundland fdy., 55%	9.00
Tungsten, spot and future short ton unit, duty paid	$12.50
Chrome ore, 48% net ton c.i.f.	$21.50 to 22.50

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	26 to 28 cents
Indian, 48-50% (nom.)	26 to 28 cents
Brazilian, 46-48% (nom.)	25 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	$43.00
Georgia, Alabama	40.00 to 47.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	35.00 to 38.00
Georgia, Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	43.00
Joliet, Ill., East Chicago, Ind.	52.00
Birmingham, Ala.	50.00 to 51.00

MAGNESITE BRICK

Per Net Ton

9 x 4½ x 2½	65.00

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	40.00
Domes, Chewelah, Wash., base	22.00

CHROME BRICK

Net ton, Chester, Pa., and Baltimore base, 9 x 4½ x 2½	45.00

Semifinished Steel

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$30.00
Pittsburgh, bessemer	30.00
Youngstown	30.00
Cleveland	30.00
Philadelphia	36.30
Chicago	31.00 to 32.00
Forging, Chicago	36.00 to 37.00
Forging, Pittsburgh	36.00
Forgings, Philadelphia	41.30

SHEET BARS

Pittsburgh	$30.00
Youngstown	30.00
Cleveland	30.00
Chicago	31.00

SLABS

Pittsburgh	$30.00
Youngstown	30.00
Cleveland	30.00

WIRE RODS

Pittsburgh, Cleveland	$35.00
Chicago	36.00

SKELP

All grades, Pittsburgh	1.60c

Ferroalloys

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82%, tidewater, duty paid	$85.00
*Ferromanganese, del. Pittsburgh	89.79
Spiegeleisen, 19-21%, domestic fur. spot†	30.00
*Ferrosilicon, 50 per cent, freight all., c. l.	83.50
Do, less carload	88.50
Do, 75 per cent	13.00 to 15.00
Ferrochrome, 66-70 chromium, 4-6 carbon. cts. lb., con., del.	11.00
Do, for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.10 to 1.15
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producers' plants, net ton	160.00
Do, one-ton to c. l.	170.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic per ton carload, 23-25% f.o.b. Anniston, Ala., 24%	122.50

†Carloads. Differentials apply to large quantities.

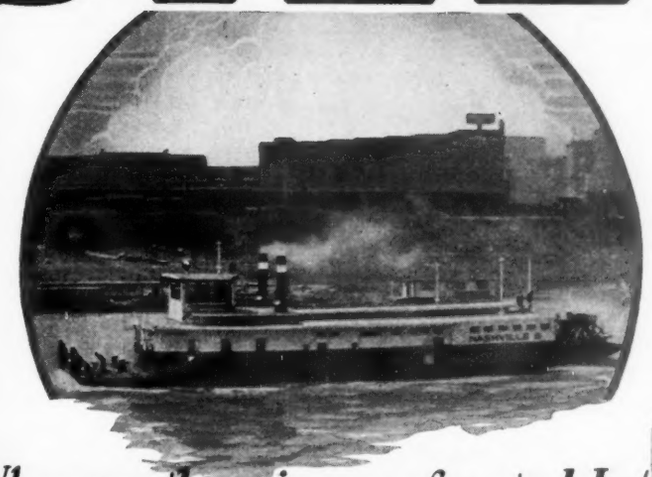
*To users of carloads to 500 tons annually. Differentials apply to users of larger quantities.

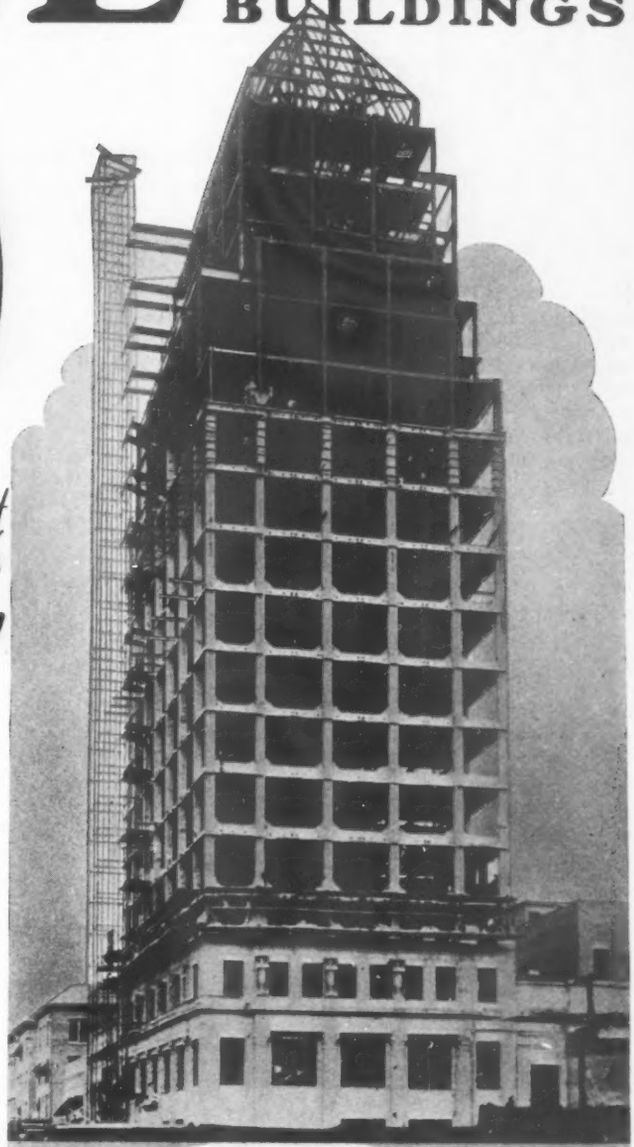
Fluorspar

85 and 5 per cent grade

Washed gravel Kentucky and Illinois mines, per net ton	$16.00 to 17.00
Washed gravel, import duty paid east, tide, gross ton	19.50

STEEL FOR BOATS BRIDGES OR BUILDINGS





Wherever there is a use for steel-Let

TENNESSEE

figure on your requirements. Quality products backed by careful inspection—prompt shipments, with intelligent cooperation through understanding of the customer's needs—these are some of the reasons which make Tennessee a desirable source of supply.

Products: Structural Shapes, Plates, Bars and Small Shapes, Sheets (Blue Annealed, Black and Galvanized), Rails and Accessories, Forgings Castings, Semi-Finished Products, Pig Iron.

Tennessee Coal, Iron & Railroad Co.

General Offices: Brown-Marx Bldg., BIRMINGHAM, ALA.

Subsidiary of United States Steel Corporation

Pig Iron

Orders and Shipments Off—Price Down 50 Cents in Eastern Pennsylvania

PIG IRON PRICES, PAGE 72

Pittsburgh—Shipments of pig iron are declining following improved activity in the first half of December. New business is well maintained. Incoming tonnage is relatively light but for one interest it is the best since January. Most contracts and orders are for small lots but a fair tonnage is on books for January shipment. Prices are subject to less pressure than formerly but are untested on some grades. Production is at a low level, with the second Shenango furnace at Sharpsville, Pa., banked.

Boston—Pig iron sales are limited to a few carloads for early shipment. Prices are unchanged.

New York—Pig iron sales have fallen off, to a total of 5000 tons for the week. New inquiry also is slack. Worthington Pump & Machinery Corp. placed 200 tons of bessemer and foundry for Holyoke, Mass. Prices are easy with Buffalo iron at $15 to $16, furnace, and southern iron at $16 to $16.50, delivered New York docks. It now develops that the American Radiator & Standard Sanitary Corp. augmented its original purchase of 50,000 tons of pig iron early in November with orders aggregating close to 25,000 tons.

Philadelphia — The Pulaski furnace, Pulaski, Va., will be blown out Dec. 31, leaving Virginia without an active furnace. The Pulaski furnace has over 40,000 tons on hand. The price continues $17.75, base, furnace. Several thousand tons of low phosphorus iron has been closed recently. The foundry iron market has declined 50 cents and now is $17, base, eastern Pennsylvania furnace. Some large consumers are sounding the market and naming prices which are not attractive to producers.

Buffalo—A district melter is in the market for 500 tons of iron, and some other inquiry of fair size is pending. However, buying is slow and deliveries are considerably behind November. Prices are steady.

Youngstown, O.—Sales and shipments of pig iron have subsided. With the banking of the Hubbard stack of the Youngstown Sheet & Tube Co., not one merchant blast furnace this week is blowing in the Mahoning valley. Two of the Campbell stacks of Sheet & Tube have just been blown out, leaving one stack active out of four. In the entire Youngstown district, this week there are only three stacks blowing out of a district total of 34.

Cleveland—New orders for pig iron in the past week dropped to 10,000 tons from 28,000 tons in the week preceding, for the furnace interests with headquarters in Cleveland. One large merchant producer has booked about 70 per cent of its normal first quarter business, sales having been fairly heavy during November and December. Shipments for all producers up to Dec. 15 were at a heavier rate than in the corresponding period of November but the movement for the month will be below that of November. A considerable number of consumers have shut down for the holidays and inventories. Cleveland makers hold to $17.50, base, furnace, for local delivery, and $16, minimum, for outside shipment. The market in eastern Ohio, northern Indiana and lower Michigan is stronger and on some recent business furnaces were able to obtain 50 cents more than formerly.

Cincinnati—Total sales of pig iron, about 1250 tons, revealed a shrinkage during the past week as melters continued to buy only for spot shipments. Contracts so far in hand represent a small proportion of normal first quarter requirements. Quotations are unchanged but are not considered strong.

Chicago—Despite the closing of a number of foundries for ten days to two weeks several thousand tons of pig iron was sold in the past week. Other tonnage sales are under negotiations or being closed. An Illinois melter placed 150 tons of southern and 350 tons of northern specification, the latter to be shipped from docks here. Dock iron is offered at concessions. Some resale steelworks iron is expected to be available due to holiday curtailment of steel ingot output. Southern iron is quoted at $10.50 to $11, base, Alabama furnace. December northern iron shipments are about 10 per cent under November.

St. Louis — December pig iron shipments will fall below the November tonnage, and there is every indication the year will close with prices at the low point of the present decline, the lowest in considerably more than a decade. Purchases recently have been moderate and there will be a carryover of undelivered tonnage to January.

Birmingham, Ala.—The movement of pig iron is at a low ebb, but makers are hopeful business will improve after the holidays. Prices are unchanged.

Toronto, Ont.—Melters are inquiring for pig iron for first quarter and a limited tonnage has been booked. Spot demand continues restricted to small lots. Prices are steady.

Ferromanganese in Slightly Better Demand; Tungsten Lo

Ferroalloy Prices, Page 72

New York—Contracting in ferromanganese is slightly more active at $85, duty paid, for carload lots. Spiegeleisen also is moving better at the unchanged price of $30, furnace, domestic 19 to 21 per cent. Tungsten ore is lower but in the absence of business exact prices are difficult to define. Quotations are mainly between $3.50 and $4 a short ton unit in bond, equal to about $11.50 to $12, duty paid, but slightly less has been heard. Ferrotungsten is $1.10 to $1.15 a pound contained. Contracts for 1931 on other ferroalloys are being made at prices recently announced.

Pittsburgh—Little change is noted in shipments of most grades of ferroalloys, the movement of ferromanganese and spiegeleisen holding to the quiet rate of preceding weeks. Contracting is more active with ferromanganese $89.79, delivered in carload lots and spiegeleisen $30, furnance, on lots up to 100 tons.

Chicago—A Canadian producer of 50 per cent ferrosilicon is offering material for contract at $4 to $5 a ton under the domestic delivered price.

Iron Ore Consumption Lower; Stocks Large

Iron Ore Prices, Page 72

Cleveland—Consumption of Lake Superior iron ore dropped to 2,639,836 tons in November, 410,224 tons less than in October, according to the current report from the Lake Superior Iron Ore association. Stocks at lower lake docks and furnaces Dec. 1 are slightly lower than a year ago. The report follows:

	Tons
Ore consumed in October	3,050,060
Ore consumed in November	2,639,836
Decrease in November	410,224
Ore consumed in Nov., 1929	4,700,925
Ore at furnaces Dec. 1, 1930	34,760,480
Ore on Lake Erie docks Dec. 1, 1930	6,466,326
Total at furnaces and Lake Erie docks Dec. 1, 1930	41,226,806
Total Dec. 1, 1929	41,499,687

Scrap

Nominal Prices Rule in Most Centers as Melters Take No Interest in Supplies

Chicago—Melters of steel scrap, fortified by large reserves, show no interest in forward commitments. Preholiday market dullness has dimmed the tendency of prices to gain strength following the recent mild relapse. Fair inquiries continue from small tonnage buyers, most for shipment early in January. Railroad scrap is being sold at nominal prices. On the Burlington list of 4000 to 5000 tons, fair prices for some grades were obtained, but shipment of a large portion was to outlying points on that road, including the St. Louis district. Heavy melting steel brought the equivalent of $10.70, Chicago switching district. Some reports are that $10.50 has been turned down by a steelworks buyer, although it is

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated.

HEAVY MELTING STEEL

Birmingham	9.50 to 11.00
Boston, dealers	6.50 to 7.00
Buffalo, No. 1	10.75 to 11.25
Buffalo, No. 2	9.25 to 9.75
Chicago	10.00 to 10.50
Cinci., deal.	9.50 to 10.00
Cleve., No. 1	10.25 to 10.75
Cleve., No. 2	9.75 to 10.25
Det. No. 1 deal.	9.50 to 10.00
Det., No. 2 deal.	7.00 to 7.50
E. Pa. del. mill	10.75 to 11.25
N. Y. del. R. R.	7.50
N. Y. deal. No. 2	5.50
N. Y., deal. yd.	5.50
Pitts., No. 1	12.50 to 13.00
St. L. No. 1 sel.	10.50 to 11.00
Federal, Ill.	9.75 to 10.25
Granite C., Ill.	9.00 to 9.50
Valleys, No. 1	12.50 to 13.00

COMPRESSED SHEETS

Buffalo, dealers	9.25 to 9.75
Chicago	8.75 to 9.25
Cleveland	9.00 to 9.50
Detroit, dealers	8.75 to 9.25
E. Pa. new mat.	9.75 to 10.25
Pittsburgh	12.00 to 12.50
Valleys	12.00 to 12.50

BUNDLED SHEETS

Buffalo	7.00 to 7.50
Cinci., deal.	8.75 to 9.25
Cleveland	7.00 to 7.50
Eastern Pa.	9.00
Pittsburgh	10.00 to 10.50
St. Louis	5.50 to 6.00

SHEET CLIPPINGS LOOSE

Chicago	5.50 to 6.00
Cincinnati	5.00 to 5.50
Detroit, dealers	6.00 to 6.50
St. Louis	5.50 to 6.00

STEEL RAILS SHORT

Birmingham	12.00 to 12.50
Boston, dealers	5.50 to 7.00
Buffalo	14.00 to 14.50
Chicago (3 ft.)	12.00 to 12.50
Chicago (2 ft.)	12.50 to 13.00
Cinci., deal.	15.50 to 16.00
Detroit, deal.	12.50 to 13.00
Pitts. (open-hearth, 3 ft. and less)	14.50 to 15.00
St. Louis	13.50 to 14.00

STOVE PLATE

Birmingham	8.50 to 9.00
Boston, con.	8.00 to 8.50
Buffalo	9.00 to 9.25
Chicago, net	6.50 to 7.00
Cinci., deal. net	5.25 to 5.75
Det., net, deal.	6.25 to 6.75
Eastern Pa.	9.00
N. Y., deal. mill	4.75
St. Louis	8.00 to 8.50

COUPLERS, SPRINGS

Buffalo	13.50 to 14.00
Chicago	12.00 to 12.50
Eastern Pa.	16.00 to 16.50
Pittsburgh	16.00 to 16.50
St. Louis	11.00 to 11.50

ANGLE BARS—STEEL

Chicago	12.00 to 12.50
St. Louis	9.50 to 10.00

LOW PHOSPHORUS

Buff., billets and bloom crops	15.00 to 15.50
Cleveland bil. and bloom crops	16.50 to 17.00
Eastern Pa.	17.00
Pittsburgh billet, bloom crops	17.50 to 18.50
Pitts. sheet bar crops	16.50 to 17.00

FROGS, SWITCHES

Chicago	10.00 to 10.50
St. Louis	11.00 to 11.50

SHOVELING STEEL

Chicago	10.00 to 10.50
Cleveland	6.75 to 7.25
St. Louis	9.50 to 10.00

RAILROAD WROUGHT

Birmingham	9.50 to 10.00
Boston, dealers	8.00 to 8.50
Buffalo, No. 1	8.50 to 9.00
Buffalo, No. 2	11.00 to 11.50
Chicago, No. 1	10.00 to 10.50
Chicago, No. 2	10.00 to 10.50
Cinci., No. 2	9.50 to 10.00
Eastern Pa.	13.50
N. Y., No. 1 deal.	10.00 to 10.50
Pitts., No. 2	12.50 to 13.00
St. Louis, No. 1	7.75 to 8.25
St. Louis, No. 2	9.50 to 10.00

SPECIFICATION PIPE

Boston	6.50 to 7.00
Eastern Pa.	11.50 to 12.00
N. Y., deal	7.25 to 7.50

BUSHELING

Buffalo, No. 1	9.25 to 9.75
Chicago, No. 1	8.00 to 8.50
Cinn., No. 1 dl.	8.00 to 8.50
Cinn., No. 2	4.50 to 5.00
Cleve., No. 2	6.00 to 6.50
Det., No. 1 new deal.	8.25 to 8.75
St. L. No. 1	7.00 to 7.50
Val. new No. 1	11.50 to 12.00

MACHINE TURNINGS

Birmingham	7.50 to 8.00
Boston, dealers	2.00 to 2.50
Buffalo	6.00 to 6.50
Chicago	4.25 to 4.75
Cinn., deal.	4.50 to 5.00
Cleveland	4.75 to 5.25
Detroit	3.75 to 4.25
Eastern Pa.	6.50 to 7.50
N. Y., deal.	3.00
Pittsburgh	6.00 to 6.50
St. Louis	4.00 to 4.50
Valleys	6.00 to 6.50

BORINGS AND TURNINGS For Blast Furnace Use

Boston	2.00 to 2.10
Buffalo	7.00 to 7.50
Cinn., deal.	4.50 to 5.00
Cleveland	6.75 to 7.25
Detroit, deal	4.75 to 5.25
Eastern Pa.	6.00 to 7.00
N. Y., deal.	3.00
Pittsburgh	7.50 to 8.00

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	7.50 to 8.00
Boston., chem.	9.00 to 9.50
Boston, deal.	2.00 to 2.50
Buffalo	7.00 to 7.50
Chicago	4.50 to 5.00
Cinn., deal.	4.50 to 5.00
Cleveland	6.75 to 7.25
Detroit, deal	4.75 to 5.25
Eastern Pa.	7.00 to 7.50
E. Pa., chem.	14.50
N. Y., deal.	3.50
Pittsburgh	7.50 to 8.00
St. Louis	6.00 to 6.50

PIPE AND FLUES

Cinn., deal.	7.50 to 8.00

RAILROAD GRATE BARS

Buffalo	7.00 to 7.50
Chicago net	6.50 to 7.00
Cincinnati	7.00 to 7.50
Eastern Pa.	9.00 to 9.50
N. Y., deal.	6.00
St. Louis	7.50 to 8.00

FORGE FLASHINGS

Boston, deal.	6.00 to 6.25
Buffalo	9.25 to 9.75
Cleve. ov. 10 in.	9.00 to 9.50
Detroit	8.00 to 8.50

FORGE SCRAP

Boston, del.	5.50 to 6.00
Chicago	13.50 to 14.00
Eastern Pa.	11.00

ARCH BARS, TRANSOMS

Chicago, net	11.50 to 12.00
St. Louis	11.50 to 12.00

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	10.50 to 11.00
Chi., steelworks	6.50 to 7.00
Cleveland	9.50 to 10.00
Eastern Pa.	11.00
Pittsburgh	11.00 to 11.50
St. Louis	7.50 to 8.00

STEEL CAR AXLES

Birmingham	14.00 to 14.50
Boston, ship. pt.	14.00 to 15.00
Buffalo	15.50 to 16.00
Chicago	15.10 to 15.70
Eastern Pa.	20.50
St. Louis	14.50 to 15.00

SHAFTING

Bos., ship. pt.	13.00 to 13.50
Chicago	12.90 to 13.45
N. Y., deal.	13.00 to 14.00
St. Louis	12.00 to 12.50
E. Penna.	18.00

CAR WHEELS

Birming., iron	10.00 to 11.00
Boston, iron	14.00 to 14.50
Buffalo, iron	13.00 to 13.50
Buffalo, steel	13.50 to 14.00
Chicago, iron	11.50 to 12.00
Chi., roll steel	13.50 to 14.00
Cincinnati, iron	10.50 to 11.00
E. Pa. steel	15.50 to 16.00
E. Pa. iron	13.50 to 14.00
Pitts., iron	13.50 to 14.00
Pitts., steel	16.00 to 16.50
St. Louis iron	10.50 to 11.00
St. Louis, steel	13.25 to 13.75

NO. 1 CAST SCRAP

Birming., cup.	10.00 to 10.50
Buffalo (mac.)	10.50 to 11.00
Boston, textile	11.50 to 12.50
Chicago, mach.	10.65 to 11.20
Chi., railroad	10.10 to 10.65
Chicago, agri.	9.50 to 10.10
Cinn., mach. cup., gross	13.50 to 14.50
Cleve. cupola	12.00 to 12.50
Det., net deal.	8.50 to 9.00
E. Pa. cupola	12.50 to 13.00
N. Y. cup. deal.	8.00 to 8.50
N. Y., del. local foundries	14.00
Pitts., cupola	12.50 to 13.00
San Fran., del.	13.50 to 14.00
Seattle	14.00 to 14.25
St. L. No. 1 ma.	9.75 to 10.25
St. L. No. 1	9.00 to 9.50

HEAVY CAST

Boston	10.50 to 11.00
Bos. mach. cast.	11.50 to 12.50
Buffalo, break	7.00 to 7.50
Cleve., break	6.50 to 7.00
Detroit, auto, net deal.	10.50 to 11.00
Det., break., dl.	6.50 to 7.00
Eastern Pa.	11.00
N. Y. No. 1 dl.	8.00 to 8.50
N. Y. break. dl.	7.00 to 8.00
Pittsburgh	9.00 to 9.50

MALLEABLE

Boston R. R.	13.00 to 13.50
Buffalo	13.00 to 13.50
Chicago, agri.	11.00 to 11.50
Chicago, R. R.	12.00 to 12.50
Cinn., R. R. dl.	12.00 to 12.50
Cinn., agri., dl.	12.00 to 12.50
Cleve., rail	12.50 to 13.00
Det. auto deal.	11.00 to 11.50
St. Louis, rail	10.50 to 11.00

RAILS FOR ROLLING
5 feet and over

Birmingham	11.25 to 11.50
Boston	8.50 to 9.00
Buffalo	10.00 to 10.50
Chicago	13.00 to 13.50
Eastern Pa.	13.00 to 13.50
New York	9.50 to 10.00
St Louis	11.25 to 11.75

LOCOMOTIVE TIRES

Chicago, cut	13.00 to 13.50
St. L. No. 1	11.00 to 11.50

LOW PHOS. PUNCHINGS

Chicago	12.00 to 12.50
Pittsburgh	15.00 to 15.50
Eastern Pa.	15.50 to 16.50
Buffalo	14.00 to 14.50

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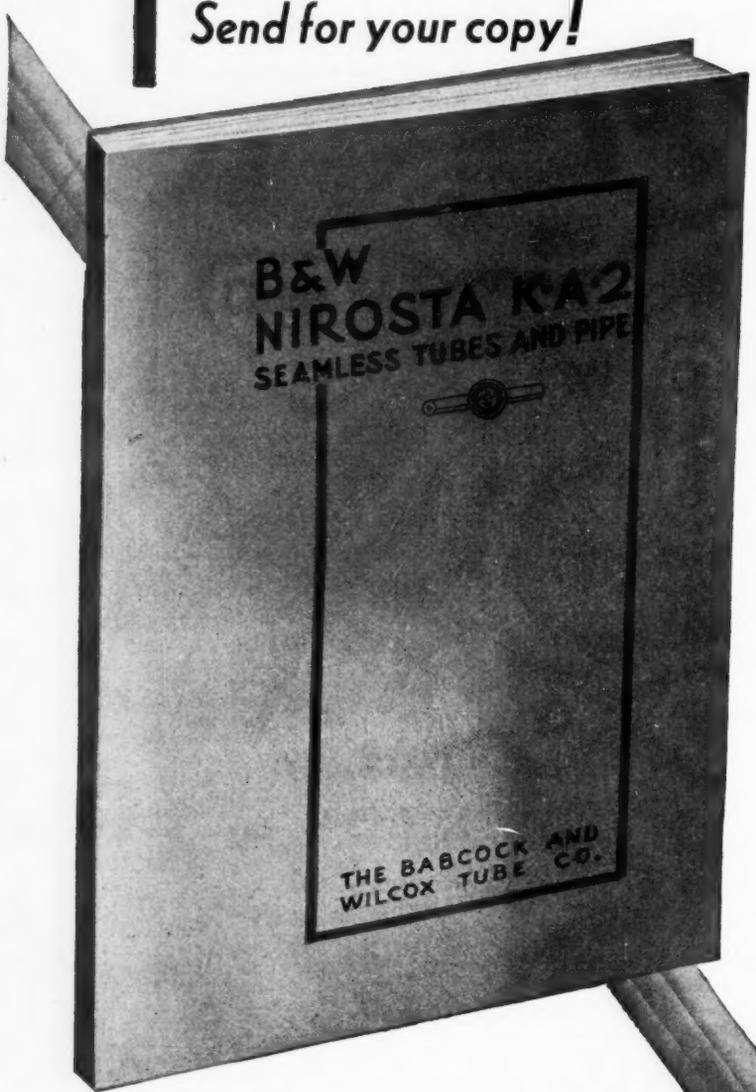

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NIROSTA KA2

THE
BABCOCK & WILCOX TUBE COMPANY

BEAVER FALLS PENNSYLVANIA

doubtful whether even tonnages could be purchased below $10.50. Many consumer quotations are nominal in the absence of sales.

Boston—For the first week in more than a month prices for various scrap items remained firm, though no business was done to bring about any change. There is little expectation of any change until the turn of the year.

New York—An advance of 50 cents a ton at Florence, N. J., is a factor in a higher market here on heavy breakable cast, dealers now paying $7.50 to $8. No. 1 heavy cast, on the other hand, is easier at $7.50 to $8, a reduction of 50 cents. Trading, generally, reflects holiday influences, being exceedingly slack.

Philadelphia—New trading in steel and iron scrap includes one lot of 5000 tons of No. 2 melting steel at $9.50, delivered, and axle turnings at $10.50 to $11.

Buffalo—Steelworks are taking no scrap and stove plate deliveries also have been suspended until further orders. Nothing is being delivered in Buffalo and its immediate suburbs and not much is going into yards. A good sized railroad list is reported to have brought $11.25, delivered, for selected No. 1 steel. Otherwise prices are nominal.

Detroit—Steel and iron scrap show no change and in the absence of buying prices are nominal.

Cleveland—Demand for iron and steel scrap still is almost entirely lacking, with no indication of early improvement. Steelworks consumers remain out of the market and are not likely to enter soon. The mill which took a few cars of material on an old order last week is receiving nothing this week. Dealers continue to pile up some material in their yards, but are taking it only at bargain prices. Quotations are unchanged.

Cincinnati—Steel and iron scrap has reverted to inactivity and quotations are unchanged and nominal. Consumers have shown no interest in covering for first quarter needs, in view of metal already laid down.

Pittsburgh—Iron and steel scrap is at a standstill, buying curtailed by seasonal influences and some embargoes on the few unfilled contracts now current. Prices are nominal and generally unchanged. Blast furnace material is up 50 cents on a recent sale at $8.

St. Louis—While buying of iron and steel scrap is not in large volume, prices are steady. Dealers are not selling at recent prices, and during the past few days have advanced quotations on some items. Steel car axles, steel wheels, one variety of heavy melting steel, miscellaneous rails, springs and malleable have advanced. Some producers of scrap have withheld their stocks from the market. This has resulted in scantier offerings than heretofore, and everything appearing is absorbed.

Birmingham, Ala.—Small lots of scrap are moving. Larger melters of heavy melting steel have a little stock on yards. Prices are still low, with no firmness.

Toronto, Ont.—Steel and iron scrap sales are in small lots. Mills are taking small lots of heavy melting steel, and shipments against contract are responsible for some activity. Recent betterment has been entirely in iron grades. Foundries are taking in supplies of machinery cast for immediate needs and inquiry is out for a fair tonnage for the Toronto radiator maker. Dealers' buying prices are unchanged.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axles	$11.00
Steel axles	10.00
Car wheels	8.00
Stove plate	8.00
Wrought pipe	2.00
Turnings	2.00
Heavy melting steel	6.00

TORONTO

Steel axles	7.00
Iron axles	7.00
Heavy melting steel	7.00
Turnings	2.00
No. 1 mach. cast (net)	9.00
Malleable (net)	7.00

Coke

Shipments to Foundries Decline—Furnaces Taking Little Tonnage—Output Reduced

COKE PRICES, PAGE 72

Pittsburgh—Demand for beehive heating coke is spotty and mainly in limited lots. The movement of by-product fuel is fairly steady. Furnace coke is in a dull market for prompt and future needs, with the price continuing $2.50 to $2.60. Foundry coke shipments are beginning to decline, while prices are steady. Beehive oven operations are off further to the lowest level of the year.

Beehive coke production in the Connellsville district during the week ending Dec. 13 was 14,220 tons, against 14,390 tons the preceding week, and 39,400 tons the corresponding week of last year according to the *Connellsville Courier*.

New York—Sluggishness prevails in furnace and foundry coke, with prices easy. Beehive furnace coke is $2.50 to $2.65, Connellsville, and standard grades of beehive foundry $3.50 to $3.75, Connellsville. Premium brands of beehive foundry are $4.70 to $4.85, Latrobe, Pa. By-product coke is $9 to $9.40, Newark, N. J.; $11, New England; and $9, Philadelphia.

Cincinnati—Demand for by-product foundry coke has been light this month in anticipation of reduced melt during the holidays.

St. Louis—New sales and shipments of coke are at the lowest point of the year due to seasonal reduction in the melt and a desire to hold down inventories. Many contracts for fourth quarter remain unfilled.

Chicago—By-product coke shipments have gained slightly over the November rate due partly to the increase in demand for foundry heating. Prices are unchanged.

Birmingham, Ala.—Production is steady but shipments are slow. Many consumers in this district plan a resumption of operations after the holidays.

Conference Board Surveys Maze of Tax Systems

Tax systems of the future probably will include taxes imposed upon real estate and upon those classes of tangible personal property that have found to be taxable, while at least the major part of the intangibles will be exempt. Property taxes will be supplemented by taxes upon other evidences of ability to pay, such as income, inheritance, business, and sales of certain selected commodities.

These are the National Industrial Conference board's conclusions from a survey, reported to be the first complete compilation of facts and statistics relating to state and local taxes in the United States.

The town system of assessment is meeting powerful opposition in many states now using it, and it is expected more states will adopt the country unit system.

Pacific Coast

Large Pipe Award Made to Canadian Producer—Plate Tonnage for Cruiser Is Placed —Cast Pipe Needs for 1931 Promise Active Buying Soon —Prices Hold Well

Seattle—One of the largest pipe awards of the year in the Pacific Northwest was closed this week by Page-Hersey Tubes Ltd., Toronto, Ont., for furnishing approximately 4855 tons of 3 to 12-inch lapwelded bell and spigot steel main with special rigid collar for Brighouse, B. C. The contract was closed through J. S. Tait & Co. Ltd., 500 Beatty street, Vancouver, on a bid of $177,688. The improvement calls for a total of 315,000 lineal feet.

Bars, Plates and Shapes

Mill prices are unchanged, reinforcing 2.30c, merchant bars and shapes 2.25c and plates at 2.10c and up. There is little interest in merchant bars. Concrete steel is being placed in small tonnages, local mills reporting the same operations. Business pending is of light proportions.

Active inquiries for plates in large tonnages have not developed. Portland purchasing agent will open bids Dec. 29 for furnishing an unstated tonnage of 24 and 30 inch steel water pipe for the Ross Island extension.

Several miscellaneous jobs involving shapes for dam, spillway, gates, frames and falsework totaling about 1500 tons, for the dam of the Lewis river hydroelectric project of the Northwestern Electric Co. have been awarded to the Willamette Iron & Steel Works and Poole & McGonigle, Portland, Oreg.

Steel for the Isthmus bridge, Coos Bay, Oreg., will be fabricated by an unstated interest, about 400 tons, general contract awarded to Liesch & Tofte, Marshfield, Oreg. Steel for the Little Klickitat bridge, Washington, slightly less than 100 tons, will be fabricated by the Pacific Iron Works, Portland, Oreg. Wallace Bridge & Structural Steel Co. this week booked 100 tons involved in several miscellaneous jobs. A. D. Belanger, Everett, Wash., has the general contract for the Kress store, Everett, calling for about 60 tons of structurals. No word has been received regarding award for the Ford assembly plant, Seattle. About 500 tons, involved in two warehouses at the Puget Sound navy yard, are pending. General contracts have been awarded.

Finished Materials Quiet

Business remains quiet with wholesale houses both here and in Portland. Purchases are in small tonnages for immediate needs. Light sheets appear to be in best demand. No changes in prices are announced.

Pipe Inquiry Is Active

Inquiry is active and several important projects are up for bids to be opened before the end of the month. These are municipal jobs and involve much improvement work included in next year's budget. This week 175 tons of cast iron pipe was awarded to the Pacific States Pipe Co., Provo, Utah, by The Dalles, Oreg. Olympia, Wash., has called bids Dec. 23 for furnishing cast iron pipe estimated to cost $30,000. Bremerton, Wash., will open bids Dec. 24 for 576 tons of 4 to 12-inch pipe and accessories. Yakima, Wash., is planning a water extension and improvement project estimated to cost $450,000.

Old Materials Weak

The scrap market is weaker, although mills are still paying $9, gross, for both steel and cast iron materials. However, receipts have been so heavy recently that buyers have eliminated territory at a distance where they heretofore absorbed the freight rate. Consequently, British Columbia and Idaho are cut off. Stocks at local mills are unusually large. There is no export demand.

Coast Pig Iron Prices

Utah basic	$22.00 to 24.00
Utah foundry	22.00 to 24.00
*German	24.25
*Indian	22.00 to 24.00

*C.i.f. duty paid.

Ship Plate Tonnage Placed

San Francisco—(*By Air Mail*)—While trading has decreased, due to the approach of the holiday and inventory period, a fair volume of business is being placed. Awards include 800 tons of reinforcing steel bars for Pier No. 23, San Francisco, booked by the Soule Steel Co., and 3000 tons of plates to an unnamed interest for a cruiser to be built at Mare Island. Heavy buying is looked for in cast iron pipe during the next month.

Concrete bar awards aggregated 1806 tons, bringing the total for the year to 69,438 tons compared with 80,809 tons for the corresponding period last year. The Concrete Engineering Co. took 250 tons for a hospital at Agnew, Calif., and the Truscon Steel Co. 137 tons for a warehouse in San Francisco. Bids were opened on 159 tons for paving work in Santa Barbara county, Calif., and on 645 tons for a bridge in Arizona. No change in out-of-stock prices is noted in the Los Angeles and San Francisco districts, 2.50c, base, on carload lots, prevailing. Little of real importance has occurred lately in the merchant bar market, sales and inquiries being confined to small lots. Prices continue at 2.25c, c.i.f.

Pipe Tonnage Is Increased

Plate awards totaled close to 4000 tons. It was reported in Dec. 11 issue of STEEL that the Western Pipe & Steel Co. had booked 3000 tons for a 38 and 51-inch welded steel pipe line for Los Angeles. The complete specification for this project will require 3700 tons. Bids have been opened on 1300 tons for a 4 to 30-inch welded steel pipe line for Chelan, Wash. Quotations continue at 2.05c to 2.15c, c.i.f.

Although numerous structural shape projects were reported placed, most were lots of less than 100 tons. Included among the larger awards were 125 tons for a studio in Burbank, Calif., placed with the Minneapolis-Moline Power & Implement Co., and 200 tons for an apartment in San Francisco, booked by the Golden Gate Iron Works. Pending business exceeds 18,000 tons. Plain shapes range from 2.15, to 2.25c, c.i.f.

Other Finished Material

Awards of cast iron pipe aggregated 1684 tons. The National Cast Iron Pipe Co. took 540 tons for Glendale, Calif. Grinnell Co. booked 135 tons for Long Beach, Calif. San Francisco awarded the National Cast Iron Pipe Co. and United States Pipe & Foundry Co., 273 tons each of 8-inch pipe and the American Cast Iron Pipe Co. 381 tons of 6-inch. Redwood City, Calif., will open bids next week on 147 tons. The East Bay municipal utility district, Oakland, Calif., will take bids Jan. 3 for 1928 tons of 6 to 20-inch pipe.

The motorship BELRAY recently loaded four locomotives from Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and the Baldwin Locomotive Works, Eddystone, Pa., for shipment to the Chilean state railways.

Steel, Wrought and Cast Iron Pipe, and Tubing

Welded Iron, Steel Pipe

Base Price $200 Ton

Base Discounts on steel pipe, Pittsburgh and Lorain, O., to jobbers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago del., 2½ points less. Wrought iron pipe, Pittsburgh base.

BUTT WELD

Steel			Iron		
In.	Blk.	Gal.	In.	Blk.	Gal.
½	58	44½	½	23	5
¾	62	50½	¾	28	11
1—3	64	52½	1 and 1¼	31	15
			1½ and 2	35	18

LAP WELD

2	57	45½	2	23	9
2½—6	61	49½	2½—3½	28	13
7—8	58	45½	4—6	30	17
9—10	56	43½	7 and 8	29	16
11—12	55	42½	9—12	26	11

BUTT WELD

Extra strong, plain ends

½	55	44½	¼ & ⅜	+13	+48
¾	60	49½	½	23	7
1—1½	62	51½	¾	28	12
2—3	63	52½	1—2	34	18

LAP WELD

Extra strong, plain ends

2	55	44½	2	29	13
2½—4	59	48½	2½—4	34	20
4½—6	58	47½	4½—6	33	19
7—8	54	41½	7 and 8	31	17
9—10	47	34½	9—12	21	8
11—12	46	33½			

To large jobbers these discounts on steel pipe increased on black by 1 point and two discounts of 5 per cent; on galvanized by 1½ points with two 5 per cents. On iron pipe large jobbers obtain additional discount of 1 point with 5 and 2½ per cent on black and galvanized.

BOILER TUBES

Carload Discounts, Lap Welded Steel		f.o.b. Pittsburgh Charcoal Iron	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¼—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

COLD DRAWN

1	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½, 5, 6	46

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill

Random lengths over 5 ft. 55%
Selected lengths, 1 to 18 ft. 53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

Six-inch and over, Bir..... $37.00 to 38.00
Four-inch, Birmingham..... 41.00 to 42.00
Four-inch, Chicago ..... 49.20 to 50.20
Six to 24-inch, Chicago..... 45.20 to 46.20
Six-inch and over, N. Y. .... 38.50 to 40.50
Four-inch, New York ..... 41.50 to 42.50
Stand. fittings, Bir. base..... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe $4 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

STEEL BARS

Baltimore	3.00c
Boston	3.265c
Buffalo	3.15c
Chattanooga..	3.10c
Chicago	2.90c
Cincinnati	3.15c
Cleveland	2.85c
Detroit	3.00c
Houston	3.00c
Los. Ang.	3.40c
New York‡(d)	3.10c
Philadelphia .	2.60c
Pittsburgh	2.75c
Portland	3.15c
San Frans. ..	3.40c
Seattle	3.15c
St. Louis	3.15c
St. Paul	3.00c
Tulsa	3.65c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.15c
Chattanooga..	3.10c
Chicago	3.00c
Cincinnati	3.15c
Detroit	3.00c
New York‡(d)	3.10c
Philadelphia .	2.60c
St. Louis	3.15c
Tulsa	3.65c

REINFOR. BARS

Baltimore 2.50c-3.31c	
Boston	3.265c
Buffalo	2.95c
Chattanooga..	3.10c
Cincinnati	3.15c
Cleveland ..2.25c-2.44c	
Detroit	3.00c
Houston	3.00c
Los Ang. cl....	2.40c
Los Ang. lcl..	2.70c
New York..2.65c-3.10c	
Phila. 2.40c-3.00c	
Pittsburgh	2.75c
San Fran. cl.	2.30c
San Fran. lcl.	2.60c
Seattle	3.15c
St. Louis	3.15c
Tulsa	3.65c
Young. 2.30c-2.60c	

SHAPES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga..	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los. Ang.	3.40c
New York(d)	3.10c
Philadelphia .	2.50c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	3.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	3.75c

PLATES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga..	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland. ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles..	3.40c
New York(d)	3.30c
Philadelphia .	2.50c
Phila. floor....	5.10c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	3.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	3.75c

NO. 10 BLUE

Baltimore	3.50c
Bost. 3/16-in.	9.915c
Buffalo	3.50c
Chattanooga..	3.60c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.10c
Detroit	3.35c
Houston	3.90c
Los Ang.	3.95c
N. Y. (d)....3.20c-3.40c	
Portland	4.00c
Phila.*†	3.05c
Pitts.**	2.75c
San Fran.	3.80c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.40c
Tulsa	3.95c

NO. 24 BLACK

Balt.*†	3.75c
Boston	4.70c
Buffalo	4.20c
Chicago	3.80c
Cincinnati	4.05c
Clev.***	3.75c
Detroit	3.75c
Los Ang.	4.70c
New York...3.55c-3.65c	
Phila.*†	3.60c
Pitts.**	3.40c
Portland	4.50c
San Fran.	4.35c
Seattle	4.50c
St. Louis	4.05c
St. Paul	3.545c
Tulsa	4.10c

NO. 24 GAL. SHEETS

Balt.*†	4.25c
Boston	5.45c
Buffalo 4.40c-4.60c	
Chicago (local del.)	4.35c
Chicago (outside)	4.35c-4.60c
Cincinnati	4.90c
Cleveland***..	4.35c
Detroit	4.25c
Houston	5.40c
Los Ang.	5.10c
New York....4.10c-4.25c	
Phila.*†	4.15c
Pitts.**	4.00c
Portland	5.00c
San Fran.	5.00c
Seattle	5.00c
St. Louis	4.60c
St. Paul	4.23c
Tulsa 4.60c-4.75c	

BANDS

Baltimore	3.50c
Boston 4.015c-5.00c	
Buffalo	3.50c
Chattanooga..	3.30c
Chicago	3.10c
Cincinnati	3.35c
Cleveland	3.10c
Det. 3/16-in. & lighter....	3.30c
Houston	3.65c
Los Ang.	4.30c
New York(d)	3.40c
Philadelphia .	2.90c
Pittsburgh	3.10c
Portland	3.50c
San Fran.	3.75c
Seattle	4.15c
St. Paul	3.75c
Tulsa	3.85c

HOOPS

Baltimore	3.50c
Boston 5.50c-6.00c	
Buffalo	3.90c
Chicago	3.65c
Cincinnati	3.90c
Cleveland	3.65c
Det. No. 14 & lighter ..	3.80c
New York	3.75c
Philadelphia .	3.15c
Pittsburgh	4.10c
Seattle	5.15c
St. Paul	3.70c

COLD FIN. STEEL

Rounds & Hexagons

Baltimore (c)	3.30c
Boston	3.50c
Buffalo	3.15c
Chattanooga*	3.85c
Chicago	3.35c
Cincinnati	3.80c
Cleveland	3.40c
Detroit	3.65c
Los Ang. (a)	4.50c
New York	3.50c
Philadelphia*	3.40c
Pittsburgh	3.35c
Portland (a)	4.50c
San. Fran.(a)	4.25c
Seattle (a)....	4.75c
St. Paul (a)..	3.85c
St. Louis	3.60c
Tulsa	4.75c

Flats and squares 50c extra, except Tulsa, where 5.14c is quoted.

(a) Rounds, hex. only.

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.30c
Buffalo	5.65c
Chicago (soft) (b)..	6.15c
Cincinnati	6.10c
Clev. (b)	5.95c
Detroit	5.40c
Phila. (c).....	4.85c
New York	5.05c

(b) Net base straightening, cutting, boxing 1 ton or more.

(c) Plus mill, size and quantity extras.

(d) Minus quant. diff.

‡Domestic bars.

*Plus quantity extras.

**Less than 25 sheets.

*†50 or more bundles.

***Less 0.15c where more than 10 bundles are ordered at once for delivery at one time.

Mill Products

Base price cents per pound f.o.b. mill, except otherwise specified. Copper and brass product prices based on 10.25c, Conn., for copper

Sheets	
Yellow brass (high)	17.25
Copper, hot rolled	20.00
Lead, full sheets (cut ½c more)	9.00
Zinc sheet (100-lb. base)	9.50
Tubes and Pipes	
Seamless yellow brass (high)	22.12½
Seamless copper	22.37½
Rods	
Yellow brass (high, full turnings)	15.50
Naval brass	17.62½
Anodes	
Copper, untrimmed	17.50
Wire	
Yellow brass (high)	17.75

Old Metals

Dealers' buying prices, cents lb.

Heavy Red Brass	
New York	7.00 to 7.25
Chicago	6.25 to 6.50
Cleveland	7.00 to 7.50
St. Louis	7.25 to 7.50
Heavy Yellow Brass	
New York	4.25 to 5.00
Heavy Copper and Wire	
New York	7.50 to 8.00
Boston	7.50 to 7.75
Chicago	7.25 to 7.50
Cleveland	6.50 to 7.00
St. Louis	7.00 to 7.50
Red Brass Borings	
New York	6.50 to 6.75
Yellow Brass Tubing	
Cleveland	4.00 to 4.50
Light Copper	
New York	6.75 to 7.00
Chicago	6.00 to 6.50
Cleveland	6.00 to 6.50
St. Louis	6.75
Light Brass	
Boston	3.75 to 4.00
Chicago	3.75 to 4.00
Cleveland	3.00 to 3.50
St. Louis	4.00 to 4.25
Zinc	
New York	2.00 to 2.25
Cleveland	1.50 to 1.75
St. Louis	2.00
Aluminum	
Clippings, soft, Cleveland	12.00 to 13.00
Clippings, hard, Cleveland	8.00 to 9.50
Borings, Cleveland	5.00 to 5.50
Mixed cast, Cleveland	6.00 to 6.50
Mixed cast, Boston	5.50 to 6.00
Mixed cast, St. Louis	4.25

Secondary Metals

Remelt aluminum No. 12	12.50
Brass ingots, 85-5-5-5	10.25

Quicksilver Is Quiet

New York—Quicksilver is quiet and unchanged at $106 to $1.08 a flask.

Metals

Copper Prices Rise and General Market Tone Strengthens—Zinc and Tin Advance

New York—Price advances in copper this week have added strength to the tone of the general metal market. Whereas about a week ago pessimism colored the outlook of most trade interests, future prospects have brightened and a firmer note is apparent in practically all nonferrous metals.

Copper quotations now are close to the 10.50-cent level touched at the close of the second week in December. This represents a rise of nearly ½-cent in the past few days. Zinc prices have advanced from ten to 15 points during the past week while lead has continued unchanged in a steady market despite recent threats of competition from foreign metal through declines in the London market. Tin is being quoted about 1½ cents above the level of a week ago and antimony is slightly stronger but in light demand.

Copper—Custom smelters continue to control the market with other producers remaining inactive and not quoting prices at any level. Export sales have been large, comparatively speaking, in the past few days while combined foreign and domestic orders have been more than enough to balance the ore intake of the smelters. Although the last published base prices on copper and brass mill products were announced as of Dec. 9, mills have been quoting unpublished figures based on the going copper market. Brass ingot values have been restored to the level of a week ago following a cut of ¼-cent on Dec. 18. Red metal scrap also is reflecting the stronger virgin copper market.

Tin—The market here was confused somewhat on Monday this week by a sudden advance of nearly 2 cents a pound in standard tin prices abroad. While it was known that producers were attempting further reduction of output through conferences in London, no definite accomplishments toward curtailment had been announced. London prices eased off again on Tuesday but the market in this country held to a level above that of recent days. Demand has been quiet. Shipments of Straits tin this month through last Saturday were 5204 long tons. This tonnage would seem to indicate a fair total for the entire month.

Zinc—Inquiries have not been heavy but fair business has been booked on slowly rising prices this week. Smelters have been reluctant to take orders freely at pevailing quotations.

Lead—Demand has been light but prices have held unchanged.

Aluminum—Prices are unchanged and the outlook points to larger business early in the new year.—*Daily Metal Trade.*

Coke By-Products

Per Gallon, Producers' Plants, Tank Lots

	Spot
Pure benzol	$0.21
90 per cent benzol	0.21
Toluol	0.30
Solvent naphtha	0.25
Commercial xylol	0.25
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.16 to 0.17
Per Pound at Producers' Plants	
Naphthalene flakes	3.75 to 4.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Delivered	
Sulphate of ammonia	$1.95

Coke By-Products Placed for Next Years Delivery

New York—Contracting for first quarter and half requirements in coke by-products shows some increase. Prices are unchanged and firm. Output continues curtailed. There is no accumulation of stock. Current demand is slow, spot business in most items being low, although phenol is moving reasonably well for the season.

Prices of the Week, Cents a Pound

	Copper: Electro delivered	Copper: Lake delivered	Copper: Casting refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Spot Antimony	Ingot Nickel
Dec. 17	10.00	.....*	9.75	23.60	23.95	5.10	4.95	4.00	22.90	7.05	35.00
Dec. 18	10.00	.....	9.75	24.00	24.30	5.10	4.95	4.00	22.90	7.05	35.00
Dec. 19	10.00	.....	9.87½	24.30	24.55	5.10	4.95	4.00	22.90	7.05	35.00
Dec. 20	10.00	.....	9.87½	25.00	25.30	5.10	4.95	4.05	22.90	7.05	35.00
Dec. 22	10.12½	.....	10.00	25.70	26.00	5.10	4.95	4.07½	22.90	7.05	35.00
Dec. 23	10.37½	.....	10.25	25.30	25.60	5.10	4.95	4.12½	22.90	7.10	35.00

*Lake producers, like large electrolytic, not quoting; electro midwest by custom smelters ⅛c over Connecticut.

Europe

German Industrial Situation Serious, Government Committee Reports

London—(*By Radio*)—A report from Berlin states the Federal Economic council which has been investigating economics in iron and steel and other industries "takes a grave view of the situation." The council recently declared steel prices would have to be reduced while steelmakers declared their production costs, even after the wage reductions that have been made, will not permit them to lower prices. Rebates, however, have been granted in some instances. German interests have taken a contract valued at $830,000 for a bridge over the Nile river. Several thousand tons of steel bars have been sold to Russia.

Semifinished steel prices have been reduced in France; otherwise the market is firmer. Iron and steelworks generally report they are booked sufficiently. An easier price tendency is noted in Belgium.

Dullness in the British market is accentuated by the approach of the holidays. Midland pig iron producers are proposing a rebate plan favoring large buyers. Continental pig iron competition at Middlesbrough may lead to price shading. Demand for East coast hematite is better, with Denmark placing orders. Fifty-eight freight cars have been purchased by the Kenya-Uganda railroad from British builders.

British Producers Find Year End Brings Some Brighter Prospects

Birmingham, Eng.—The Barrow Hematite Steel Co. has decided to damp down its two blast furnaces this week end. Heavy stocks have been accumulated and as the company's steelworks closed down last July, owing to lack of rolling orders, a good outlet for the iron was lost. The Barrow hoop works will continue to operate, but 300 men will be out of work owing to closing of the furnaces.

Production on the northwest coast is now less than for many years. There are heavy stocks everywhere and buying is small. Makers are, however, maintaining prices but values in fact are such that further reductions would mean a loss to the maker.

In the Midland district it is evident that buying has finished for the year with the exception of a few odd lots. Pig iron producers say specifications have been better since the reduction about a month ago, and they are satisfied that if it did nothing else it stifled Continental competition.

Foundries are in a poor way and refuse to contract over first quarter as it suits them far better to apply to the furnaces for delivery of a truck load of iron. Consumers on their part realize that the possibility of trouble in the coal industry may send up the price of raw materials. At the same time they are content to await developments. It is comparatively easy to buy furnace coke at 12s ($2.91) at the ovens, though the producer's quotation is often 13s ($3.15). The latter, however, is glad to be able to close a contract and therefore willingly makes a concession.

In the Middlesbrough pig iron district it is reported that competition is keen from Midland and Continental makers and price concessions may have to be made.

Export business from Middlesbrough furnaces is difficult but it is hoped to recapture some of the Continental markets providing the present trend of Continental materials continues upward. East coast hematite makers have heavy stocks but they are being reduced slowly and it is hoped that the steady improvement in this trade will prevent further cheapening in prices. The basis for market transactions is £3 11s ($17.25) for ordinary qualities of hematite.

In the Birmingham district there is an absence of Continental business. This trade has dwindled markedly since prices were advanced a week or two ago. A fair tonnage is coming into the district, but it is against old contracts and everywhere there are signs that works which usually buy Continental steel are holding off, owing to the uncertain price position.

It is practically impossible to obtain quotations for billets in this district. Works are not short of material for some good contracts were booked when prices fell a month or so ago and there can be no question of any urgent need of replenishing stocks either of billets or steel bars. In any case consumers are doing so little in their own works that they need no more than a few tons to supply current orders.

Steel Orders Are Scarce

Unfortunately for British steel works they are not getting the trade formerly given Continental agents. Everywhere there is a great scarcity of orders for British steel. In the Middlesbrough district most works are on short time and this state of things will prevail till the end of the year. In the Black Country some mills that specialize in steel for automobile manufacture are getting rather better specifications.

Structural steel is being bought from hand to mouth. Building projects have been postponed or held up with the result that engineers have little business to carry over into 1931.

Makers of galvanized sheets met this week and reaffirmed the basis of £11 5s ($54.67) for 24 gage. After the spurt in contracting which followed the last reduction business has settled down to a few orders for home consumers.

In the Welsh tin plate industry there is a definite improvement resulting from the recent reduction and freedom from control. The quotation generally is 16s ($3.88) but this is being cut to 15s 9d ($3.82) and some fairly heavy business has been booked at the lower prices. Inquiries have come in from Australia, Canada and Holland, while some of the larger home buyers have contracted into first quarter. Shipments from Swansea showed an improvement of 28,913 boxes on the week and stocks now stand at 188,804 boxes.

French Comptoirs Have Varying Success

Paris—The situation on the French iron and steel markets has remained satisfactory during the last part of the year, whereas usually there is a slackening off of business at that

time. Inquiries are numerous, and purchasers who for several months have transacted little business again are buyers of heavy tonnages.

The improvement of the export market has reacted on home trade, and in most metallurgical centers prices are on the upward trend. De Wendel, Chiers, Knutange and Nord-Est have increased prices 20 to 40 francs ($0.78 to $1.56) per metric ton, and it is hoped that this policy will have a good influence on the tendency of future business. Steel merchants are making inquiries for bars to replenish stocks, which at present are rather low. This certainly means that rock-bottom prices have been touched.

Price Rise Aids Comptoir

This increase of prices is especially welcome as it will have an important influence on the maintenance of the A-products comptoir. Indeed, in November, clients were expecting a decrease in prices quoted by this sales organization for beams, and while inquiries were numerous, orders were scarce. It now is certain that the comptoir will stand firm on its prices, and it is expected that many orders which had been kept back will be remitted during the present month.

In regard to semifinished products, the position of this comptoir is much better, as the directors have decided to follow competitive prices which can be quoted either by members of this comptoir or by the non-adherent works for squares or flats to be used for rolling purposes. Consequently, there are no official prices, and billets are quoted at about 490 francs ($19).

Bar Demand Is Satisfactory

In the merchant bar department, orders are numerous and inquiries are satisfactory. In the eastern district 540 francs ($21) is the lowest price quoted for rolled steel, and 530 francs ($20.60) is the level of quotations for reinforced concrete bars. In the north, works are accepting orders at 550 francs ($21.45).

The market for sheets and plates is not satisfactory. The comptoir seems unable to provide its works with orders. Competition is severe for the sizes controlled by this organization. The smaller sizes, under 3 millimeters, are free. Heavy tonnages are in stock and have a disastrous influence on steadiness of the market. Longwy and Leval Aulnoye are quoting 740 to 750 francs ($28.75 to $29.15) for 2-millimeter to 3-millimeter sheets and 850 francs ($33) for medium sheets.

The pig iron department is completely overturned. The price of 300 francs ($11.05), f.o.t. Longwy, was quoted by all works, but pig iron has been sold, especially in the south of France, at 280 francs ($10.90), probably for Roechling pig iron.

It has been announced lately that changes have been made in the board of directors of the Citroen concern. Andre Citroen will again take in hand the management of his society. The Lazard bank, which, during past years, has financed the firm, is out of the new combination. It is rumored that General Motors assists Citroen's.

French Output Gains

Paris—Output of pig iron, steel ingots and castings in France in October gained over September. Comparative figures follow, in metric tons:

	Act. Fur. on Mon. ave.	last day	Pig iron	Steel ingots and castings
1913	131		433,940	390,580
1927	142		774,785	689,610
1928	153		841,415	782,995
1929	156		870,000	805,500
1930				
Jan.	156		875,000	800,000
Feb.	154		815,000	772,000
March	152		898,000	848,000
April	153		854,000	787,000
May	154		899,000	853,000
June	.....		841,000	753,000
July	147		861,000	790,000
August	143		845,000	775,000
Sept.	140		800,000	764,000
Oct.	139		830,000	796,000

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, December 22	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f. o. b. Ship at Port of Dispatch—By Cable		£ s d		£ s d		£ s d		£ s d
PIG IRON								
Foundry No. 3, Silicon 2.50-3.00	$15.43	3 3 6*	$12.39	2 11 0	$12.39	2 11 0	$13.37	2 15 0
Basic-bessemer	15.92	3 5 6†	11.66	2 8 0	11.66	2 8 0	13.37	2 15 0
Hematite, Phosphorus 0.02-0.05	17.25	3 11 0	.....	.....	.....	.....	17.74	3 13 0
SEMIFINISHED STEEL								
Billets	$27.34	5 12 6	$17.98	3 14 0	$17.98	3 14 0	$17.50	3 12 0
Wire rods	41.31	8 10 0	29.16	6 0 0	29.16	6 0 0	29.16	6 0 0
FINISHED STEEL								
Standard rails	$40.10	8 5 0	$31.59	6 10 0	$31.59	6 10 0	$32.08	6 12 0
Merchant bars	1.68c	7 15 0	.95c	4 6 0	.95c	4 6 0	1.07c	4 17 0
Structural shapes	1.68c	7 15 0	.83c	3 15 0	.83c	3 15 0	.83c	3 15 0
Plates, ship, bridge and tank	1.79c	8 5 0	1.07c	4 17 0	1.07c	4 17 0	.83c	3 15 0
Sheets, black, 24 gage	1.90c	8 15 0	1.83c	8 6 9	1.83c	8 6 9	1.93c	8 15 0
Sheets, galvanized, 24 gage, corrugated	2.44c	11 5 0	2.35c	10 13 9	2.35c	10 13 9	2.31c	10 10 0
Bands and strips	2.06c	9 10 0	1.02c	4 12 6	1.02c	4 12 6	.96c	4 7 0
Plain wire, base	2.06c	9 10 0	1.21c	5 10 0	1.21c	5 10 0	1.23c	5 12 0
Galvanized wire, base	3.04c	14 0 0	1.49c	6 15 0	1.49c	6 15 0	1.54c	7 0 0
Wire nails, base	2.39c	11 0 0	1.21c	5 10 0	1.21c	5 10 0	1.23c	5 12 0
Tin plate, base box 108 pounds	$ 3.89	0 16 0	.....	.....	.....	.....	$ 8.26	1 14 0
Domestic Prices at Works or Furnace—Last Reported				Francs		Francs		Marks
Foundry No. 3 Pig Iron, Silicon 2.50-3.00	$15.43	3 3 6	$11.79	300(2)	$15.90	570	$19.79	83
Basic pig iron	15.80	3 5 0	14.34	365(1)	12.28	440	21.10	88.50
Furnace coke	3.16	0 13 0	6.60	168	5.02	180	5.13	21.40
Billets	27.34	5 12 6	19.26	490	17.02	625	28.01	117.50
Standard rails	1.79c	8 5 0	1.41c	785	1.59c	1,220	1.47c	136
Merchant bars	1.68c	7 15 0	.97c	540	1.01c	780	1.48c	137
Shapes	1.84c	8 10 0	1.12c	620	.97c	745	1.45c	134
Plates, ship, bridge and tank	1.95c	9 0 0‡	1.37c	760	1.08c	830	1.65c	153
Sheets, black, 24 gage	1.90c	8 15 0	2.29c	1,270	2.41c	1,850	1.36c	126
Sheets, galvanized 24 gage, corrugated	2.44c	11 5 0	3.06c	1,700	2.73c	2,100	3.67c	340
Plain wire	2.06c	9 10 0	1.85c	1,200	2.15c	1,650	2.34c	217
Bands and Strips	2.17c	10 0 0	1.22c	680	1.43c	1,100	1.72c	159

*Middlesbrough; †Basic; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 12s 0d ($2.92) f. o. b. Ferromanganese £12 5s 0d ($59.54) delivered Atlantic seaboard, duty-paid. German ferromanganese £12 5s 0d ($59.54) f. o. b.

The equivalent prices in American currency are in dollars per ton for pig iron, coke, semi-finished steel and rails; finished steel is quoted in cents per pound and tin plate in dollars per box. British quotations are for basic open-hearth steel. French, Belgian, Luxemburg, and German are for basic-bessemer steel.

Machinery

WITH 1930 drawing to a close, revival in the machine tool market is yet to come. It is significant that the industry has come through in much better condition than in previous crises, and that the future is faced with confidence. Activity in engineering development, which became apparent about the middle of the year, continues unabated, and much faith is pinned upon resulting improvements as active factors in sales stimulation. After months of low ebb production, stocks have been reduced to the point where comparatively slight recovery in market activity will result in immediate relief of unemployment.

New York—While some increase is noted in inquiry, the volume of business actually placed for machine tools shows little improvement. With most dealers and builders December has been a dull month. Some interest is reported for the first quarter of next year, but action on these tentative inquiries is uncertain. The general opinion among sellers of machinery is that the recovery in this business will be gradual during the early part of 1931. Several of the largest buyers of machine tools already are equipped to handle any volume of production which is likely to develop for some time. Meanwhile, machine builders continue to operate on reduced schedules.

The outlook for business from Detroit is somewhat more hopeful than during the last few months, and some buying by the makers of automotive parts is expected. Grinding machinery business is slack, although Russia is expected to buy more of this equipment in the near future. Conditions in the ball bearing plants generally remain unchanged, averaging three days production a week. The Bureau of Light Houses is taking bids on five motor driven geared head lathes. Most Federal government machine shop requirements are being expedited for bids, especially equipment for navy department yards.

Pittsburgh—The depression of the machinery market is aggravated by its usual year-end dullness. Pending work is only fair and little new inquiry has developed, orders being scattered and usually involving only individual tools. Railroads continue inactive as far as new machine tool purchases are concerned.

United Engineering & Foundry Co. is expected to furnish a 72-inch continuous sheet mill for the Otis Steel Co., Cleveland.

Worcester, Mass.—The machine tool market remains stagnant, grinders continuing to show but little activity, as is also the case with lathes and drills. There is some activity in textile machinery but in general the outlook for the first month of the new year is not particularly promising.

Cleveland—With the portentous year of 1930 drawing to a close, machine tool builders and dealers in this district show every sign of having passed through the ordeal of depression much more successfully than sometimes has been true in the past. Furthermore, they face the future with conservative confidence. The situation is summed up by one executive as follows: "We have seen signs of improvement through the last part of December, by a firmer tone to inquiries and even by actual business being placed for shipment after the first of the year. It looks as if things were improving."

Production continues at a low ebb, the stagger system of employment being followed in most cases. Extension of the holidays over weekends is general, and one tool company has announced a complete shutdown of two weeks. Stocks have been pulled down to the point where even a mild business revival should result immediately in marked improvement in employment. Engineering activity continues unabated, much faith being pinned upon new developments to hasten recovery of business after the first of the year.

Chicago—Prospective shop equipment business from western railroads has enlivened an otherwise dragging machine tool market in this district. Chicago, Great Western has issued a preliminary inquiry list of 12 items for the purpose of obtaining estimates for prospective purchase after the first of the year, at which time a definite inquiry will be out. Included are two shapers, two lathes, an axle lathe, two 25-ton hydraulic bushing presses, a grinder and other equipment. Santa Fe is out for a pipe threading machine and a pipe bending machine. Burlington is taking bids on a 6-foot radial drill. As a number of manufacturing plants in the Chicago area closed down Wednesday until after the week-end, and will do the same next week, the market is expected to be lifeless until after the first of the year. A large list of production and shop tools was sold at federal court auction at the plant of the Liberty Coaster Mfg. Co., 6041-51 West Grand avenue, Chicago, on Dec. 18.

Dead Spaces Cut Effective Area in Blast Furnaces

Many dead spaces have been shown to exist in beds of solids in a blast furnace by tests conducted by the North Central experiment station of the bureau of mines, Minneapolis, in co-operation with the University of Minnesota. The pressure developed in a blast-furnace depends to a large extent upon the effective area available in the charge column for gas flow. In the tests, the effective free area of a typical blast-furnace charge was calculated from the volume of gas passing through a bed and the velocity of gas in the bed. Velocity measurements in the bed showed that the gas must have been passing through only 8.15 per cent of the total volume in order to attain the measured velocities. A similar charge was found to contain 33 per cent voids, or about four times the volume through which the gas was actually moving. Changes in the physical character and uniformity of size of the raw materials entering a blast furnace are important because a change in uniformity of size that produces a change in effective free area of 1.0 per cent of the total volume means a change of about 12 per cent in the area through which the gases may pass.

Scrap Industry Pays High for Its Accidents

Total direct and indirect cost of accidents in the scrap iron industry during 1929 was $767,000 and for industry in the United States during the same period approximately $10,000,000, it was estimated at the Ohio state conference of the scrap industry, at Columbus, O., Dec. 9.

The scrap iron industry had 1508 accidents last year, totaling a time loss of 86,888 days, it was reported by Thomas Kearns, superintendent of the Ohio industrial commission.

In comparing the risks of various industries, Mr. Kearns stated that the steel industry in Ohio had a compensation rate of 80 cents per $100 of payroll, while the scrap iron industry had a compensation rate of $8 per $100 of payroll.

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New England

DANBURY, CONN.—City is reported to plan the erection of a trade school. Architect will be selected to prepare preliminary plans.

BOSTON—Economy Umbrella Mfg. Co., 96 Essex street, proposes to rebuild its plant, recently damaged by fire. Cost is estimated at $40,000. S. Chase is manager.

BOSTON—Thompson Wire Co., 31 Mildred avenue, is completing construction of a new plant in Mattapan, a suburb, built at a cost of $40,000 for the manufacture of flat wire and cold-rolled strip steel.

EVERETT, MASS.—Warren Foundry & Pipe Co. Inc., Phillipsburg, N. J., is constructing a plant unit, 75 x 100 feet, on a 10-acre site in South Everett. A foundry and four other units will be built.

SPRINGFIELD, MASS.—Springfield Wire & Tinsel Co., 68 Taylor street, has awarded contract for the construction of a plant in West Springfield. Estimated cost, $40,000.

SPRINGFIELD, MASS.—Rolls Royce of America Inc., Long Island City, N. Y., will move its coach and body works from Long Island City to the East Springfield plant on Feb. 1. H. J. Fuller is president.

CRANSTON, R. I.—Langelier Mfg. Co., Arlington, Providence, R. I., is reported to plan a machine shop addition here to be built at a cost of about $40,000. H. K. Allard is president. Company manufactures special machinery.

New York

ALBANY—Mattson Wire & Mfg. Co. Inc., Joliet, Ill., noted as planning a plant here, advises through H. I. Mattson, president, that a site has been secured and a plant, which will be equipped with the company's own make of fence machines for the manufacture of snow fence. (Noted Nov. 20.)

NEW YORK—Ade Machine Corp. has been incorporated with $10,000 capital by H. J. Devarco, 165 Broadway.

NEW YORK — Wanderman-Brand Inc. has been incorporated with $25,000 capital by T. A. Delman, 291 Newkirk avenue, Brooklyn, to deal in steel tubing.

NEW YORK—Federal Iron Works has been incorporated with $10,000 capital by Benjamin & Benjamin, 19 West Forty-fourth street, to operate an iron works.

NEW YORK—Dimmo Mfg. Co. has been incorporated with $20,000 capital by Massa, Weiss & Brennan, 1819 Broadway, to make electrical appliances.

SYRACUSE—Pierce, Butler & Pierce Mfg. Corp., 41 East Forty-second street, New York, will build a plant here for the manufacture of boilers. Cost is estimated at $100,000. (Noted July 17.)

TUCKAHOE—Three machine shops owned by the Benedict Stone Corp., 420 Lexington avenue, New York, recently were virtually destroyed by fire. Loss is reported to be $500,000.

Pennsylvania

BOYERTOWN—Lewis Campbell Jr. Inc. has been incorporated with $75,000 capital by Ray A. Houck, Reiffton, Pa., treasurer, to manufacture and deal in iron, steel, brass and copper pipe fittings.

OIL CITY—National Transit Co. has awarded contract to L. O. Bouquin Co. for a machine shop, warehouse and office to be erected at Seneca street and Center avenue. Robert Stormer is architect.

PHILADELPHIA — Ridgway Auto Body Works has leased a plant at 1720 Fairmount avenue.

PHILADELPHIA — Link Smelting Works recently suffered damage by fire to its 2-story foundry at Sixteenth street and Washington avenue.

PHILADELPHIA — Gilmour Steel Products Co., 1505 Race street, has a building permit for construction of a $3500 wire storage unit, to be erected on Whitaker street.

PHILADELPHIA—Philadelphia Storage Battery Co., Victory building, is renovating the Holmes mill, recently noted as purchased, and has acquired other buildings along Alleghany avenue and Tioga street, according to an advice. Buildings will be erected which will almost double the capacity of the plant. (Noted Dec. 11.)

PHILADELPHIA — Westinghouse Electric & Mfg. Co., J. E. Barkle manager of the South Philadelphia works, advises that alterations and additions recently noted will be for the purpose of locating all locomotive equipping and testing activity in connection with oil-electric and electric locomotives at this plant. Work formerly was done at the East Pittsburgh works. Improvements will take about 6 months. H. H. Bates is works engineer. (Noted Dec. 11.)

PITTSBURGH—Board of commissioners, Allegheny county, 519 Smithfield street, has closed bids on airport improvements, to cost $45,000. Hangars and a garage unit are included.

New Jersey

CAMDEN—New Jersey Port commission will build a warehouse unit on the Delaware river between Clinton and Pine streets. Cost is estimated at $500,000. Site is 160 x 300 feet. Charles W. Staniford, 50 Church street, New York, is architect.

EAST BRUNSWICK—Plant of 7 or 8 stories to be built here by Anheuser-Busch Inc., A. A. Busch president, 721 Pestalozzi street, St. Louis, will include a machine shop, garage, and power plant. Cost of the entire project is estimated at $2,000,000.

GARWOOD—Tuco Federal Corp. has been incorporated with 1250 common shares by Wallace R. Foster, 140 Nassau street, New York, to deal in pipe and iron fittings.

IRVINGTON—T. J. Lee Jr., manufacturer of plumbing supplies, 495 Lyons avenue, plans to build a 2-story shop and storage building, 50 x 200 feet, at 481 Lyons avenue, maturity indefinite. Approximate cost, $40,000.

NEWARK—H. Loeffler & Co. has been incorporated with $125,000 capital by Edward Wolf, 48 North Bergen street, to deal in tools.

NEWARK—Heller Tool Co., P. E. Heller president, 865 Mount Prospect avenue, plans to erect a 2-story plant addition at Mount Prospect avenue and Erie railroad. Cost is estimated at $40,000.

PATERSON—Peters Machine Co. has been incorporated with $50,000 capital by A. C. Ambrose, 146 Washington street, to deal in electrical machinery.

TRENTON—Supersteam Service Co., New York, has leased a plant here formerly occupied by the Mercer Auto Co., and will manufacture steam-driven buses. E. W. Delling, formerly of the Mercer company, is president and general manager.

Ohio

CLEVELAND—U. S. Electric Swivel Co., 1834 East Sixty-fifth street, is in the market for a small filer, small miller and 36-inch square shears with dial indicator.

CLEVELAND—Yoder Co., C. M. Yoder president, 5500 Walworth avenue, manufacturer of special machinery, will let contract for the construction of a one and 2-story plant to be built at Walworth avenue and West Fifty-fifth street. W. H. Hatch, 559 Hippodrome building, is architect.

COLUMBUS—Elliott Condenser Valve Corp. has been incorporated with $3000 and 250 no par shares by Stuart R. Bolin, 1205 Beggs building.

WOOSTER—National Fire Equipment Co. has been incorporated with $25,000 capital by Weygandt & Ross.

Indiana

SOUTH BEND—South Bend Current Controller Co., manufacturer of remote control systems and other apparatus, advises through L. W. Guin that plans

for a proposed new unit will not mature until February, 1931. (Noted Dec. 11.)

WARSAW, IND.—City council is considering erection of a municipal light and power plant. Harry Watkins is clerk.

Michigan

DETROIT—Fisher Combustion Devices Corp. has been incorporated with $1000 capital by Roy R. Fisher, 2539 Woodward avenue, to manufacture and sell fuel combustion devices.

DETROIT—Fairmount Stoker Corp., 716 Fidelity Trust building, has been incorporated with $100,000 capital by McKee Robison, to manufacture and sell automatic stokers, pumps, fans, motors, screens and conveyors.

GRAND RAPIDS—Deveaux-Hall Motors Corp., recently organized by Norman Deveaux, Col. Elbert J. Hall and associates, is reported to have arranged for motor production with Continental Motors Corp. of Muskegon, Mich., and to be planning an eastern plant here for the manufacture of a new car. As noted, the same interests have acquired the Oakland, Calif. plant of the Durant Motor Co. of California.

MUSKEGON—Modern Devices Inc. has been organized with 2400 no par shares by Fred A. Backstrom and Russell Spring of the Eagle Foundry and Machine Co. Company will promote the manufacture and sale of a chipping hammer invented by R. J. Champayne, Rockford, Ill. Aluminum die castings will be used as housings and the hammer will be powered by a 0.1-horsepower universal motor. Eagle company, specializing in iron castings, probably will not provide plant facilities.

SAGINAW—Malleable Iron division of General Motors Corp. has awarded contract to the Austin Co., 11-205 General Motors building, Detroit, for an annealing and kiln plant.

Illinois

CHICAGO—Safety Driving Lights Co., 307 North Michigan avenue, has been incorporated with $50,000 capital by Cassells, Potter & Bentley, 1060 The Rookery, to make electrical and mechanical equipment.

CHICAGO—Suttle Equipment Co., 231 South LaSalle street, has been incorporated with 500 no par shares by Chapman & Cutler, 111 West Monroe street, to manufacture and repair electrical equipment.

CHICAGO—American Hoist & Derrick Co., 205 West Wacker drive, advises that it has secured warehouse facilities for added stocks of machines and parts for the Chicago district. General offices of the company, of which F. J. Johnson is president, are located in St. Paul, Minn.

EAST ST. LOUIS—General Welding Products Inc., 5027 McKissky street, St. Louis, George W. Parker president, has acquired a site here for a new plant. New unit will contain 20,000 square feet of floor space, and all operations will be transferred here eventually. Company specializes in storage tanks.

GALESBURG—Rowe Mfg. Co., whose plant recently was noted as having been damaged by fire, advises through H. C. Nelson, secretary, that fire destroyed one main unit, including equipment, material and finished goods. A new unit will be built as soon as possible and purchases of equipment and materials for construction and manufacture are being made. (Noted Dec. 18.)

Southern States

WASHINGTON—Bureau of standards will build a hydraulic laboratory at a cost of about $350,000. Pumps, tanks and other equipment will be installed.

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids Jan. 13 for two motor-driven band saws, on schedule 4767, class 174. Alternate bids will be taken for delivery to the naval supply depot, naval operating base, Hampton Roads, Va., or to the district supply officer, pier 44, San Francisco.

BOYNTON, FLA.—Col. Robert R. McCormick, Roosevelt road, Chicago, is reported to plan an estate here, to include a yacht basin, airport and seaplane accommodations.

MIAMI, FLA.—All-American airport proposes to build a new hangar unit in the near future.

BALTIMORE — American Cooperage Co., Fayette and Kresson streets, plans to erect a 1-story plant addition for the manufacture of steel drums.

BALTIMORE — Enterprise Wire & Iron Works, 423 North High street, plans to build a 1-story plant, 54 x 80 feet, at 418 North Colvin street.

BERLIN, MD.—Best Universal Lock Co., Seattle, is reported to be considering the construction of a lock manufacturing plant here. Estimated cost is reported at $175,000.

CHATTANOOGA, TENN.—New Era Electric Devices Inc. has been incorporated with $15,000 capital by Peter F. O'Neill, 1800 Ringgold road. Company will make an electric control for textile machinery, developed by C. W. Whitehead, Center street.

MEMPHIS, TENN. — Virginia-Carolina Chemical Co., Richmond, Va., has awarded contracts to Meers & Wallenka, 63 South Third street, Memphis, for a warehouse unit here and one at Jackson, Miss. Cost is estimated at $40,000 each.

NASHVILLE, TENN.—State department of education will purchase equipment and tools for a proposed 3-story industrial college. Cost of the entire project is estimated at $1,000,000.

BRISTOL, VA.—Bristol Steel & Iron Works Inc., successor to Twin City Boiler Works Inc., advises through W. J. Tilley, secretary, that the company is in the market for a Nazel air hammer, 5 x 5 inches or 6 x 6 inches, self-contained with compressor and motor, in good operating condition. No further equipment is needed at the present time. (Noted Dec. 11.)

PETERSBURG, VA.—State of Virginia, board of education, state house, Richmond, Va., proposes to erect a 3-story industrial college here at a cost of about $1,000,000. W. R. McCornack, 10006 Carnegie avenue, Cleveland, is architect.

RICHMOND, VA. — Republic Iron Works of Virginia has been incorporated with $50,000 capital by A. L. Joseph, 3209 Butt lane.

ST. CHARLES, VA.—Old Dominion Power Co., Norton, Va., plans an addition to its substation here.

Missouri

ST. LOUIS—Missouri, Kansas & Texas railroad, M. H. Cahill president, Railway Exchange building, will improve its facilities and equipment here. Total of $7,000,000 has been appropriated for expansion during 1931.

Texas

GALVESTON—City council is reported to plan development of a municipal airport, to include hangars, repair shops and other units. J. W. Berretta Engineers Inc., National Bank of Commerce building, San Antonio, Tex., is engineer. Cost is estimated at $80,000. (Noted Oct. 23.)

Wisconsin

MANITOWOC—Aluminum Specialty Co. advises through W. E. Spindler, president, that contracts have been awarded to Casper Construction Co. and work has been started on plant extensions which will add 7200 square feet of floor space. (Noted Dec. 18.)

Iowa

COUNCIL BLUFFS—Council Bluffs Airways, J. G. Coulter president, will build a hangar unit at the municipal airport.

DAVENPORT—Chevrolet Motor Co., 3044 Grand boulevard, Detroit, has leased 8000 square feet in the former Brammer Washing Machine plant on Rockingham road, and will establish a zone truck assembly plant. T. J. Schuster is in charge.

DES MOINES—Chevrolet Motor Co., 3044 Grand boulevard, Detroit, is establishing a zone assembly plant for trucks here in a plant on Fifth street. A. A. Murphy is in charge.

SPENCER—Skelly Oil Co., Eldorado, Kans., will build a gas plant here, to include two 10,000-gallon tanks, two 10 x 40-foot tanks and two compressor units, with a capacity of 7000 cubic feet per hour, with two 10-horsepower motors. W. G. Watkins is company engineer.

Utah

PROVO — Pacific States Cast Iron Pipe Co. is completing improvements and extension to its plant. Water and gas pipe of larger sizes will be made.

Pacific Coast

LOS ANGELES—Southern California Edison Co. Ltd., R. H. Ballard president, will expend $25,200,000 in 1931 for construction and improvements to power facilities. Plant at Long Beach, Calif., will be improved by installation of a 135,000-horsepower turbine and fuel conveyors. New substations will be built at various points.

MARE ISLAND, CALIF.—Bureau of supplies and accounts, navy department, Washington, will receive bids Jan. 13 on schedule 4763, class 166, for one portable arc welding set with gasoline engine drive, range 90 amperes to 375 amperes at 25 volts, for delivery to the naval supply officer at the navy yard here.

OAKLAND, CALIF.—Motor Vehicle Refrigeration Ltd. has been organized here to manufacture truck bodies equipped with electrical refrigeration equipment.

OAKLAND, CALIF.—Plant of the Durant Motor Co. of California, 10910 East Fourteenth street, has been acquired by Norman Deveaux and associates. Plant will be utilized for the manufacture of an automobile reported to be known as the Deveaux Six. Plant has been acquired also at Grand Rapids, Mich., according to reports. Elbert J. Hall will be associated with the new company as designer.

BELLINGHAM, WASH.—Carson & Schank Inc. has awarded contract for a 1-story machine shop. Estimated cost, $20,000.

SEATTLE—Ellsworth Storey, architect, has completed preliminary plans for a group of industrial school buildings to be built on Wrangel island, Alaska. About $171,000 will be expended.

Dominion of Canada

EDMONTON, ALTA.—Standard Iron Works recently was virtually destroyed by fire. Damage is estimated at $100,000.

EDMONTON, ALTA.—City council is considering the development of the municipal power plant, for which construction of a boiler plant has been proposed for 1931. Estimated cost, $450,000. Eventual expenditures would amount to $1,800,000. J. M. Douglas is mayor.

WINNIPEG, MAN.—Leyland Motors Ltd., Leyland, Lancashire, Eng., advises that reported construction of an assembly plant is incorrect, as to actual construction. Company recently sent a director here to investigate possibilities, and further developments, if any, await his return. (Noted Nov. 13.)

COBURG, ONT.—South Bend Bait Co. of Canada Ltd. has started operations here for the manufacture of reels, rods, bait and other sports goods. Company is capitalized at $40,000 and is a subsidiary of the South Bend Bait Co., South Bend, Ind. Canadian offices will be established at Montreal, Que., with A. E. Adcock, vice president, in charge.

HAMILTON, ONT.—Metal Textile Corp. Ltd. has been incorporated with $40,000 capital by John R. Marshall and Stanley R. Jeffries, to manufacture and deal in metal fabrics.

LONDON, ONT.—London Construction Co. Ltd. has been incorporated with 1000 no par shares by Arthur F. Nesbitt and John V. Coughlin, to manufacture machinery and material used in construction.

OSHAWA, ONT.—Coulter Copper & Brass Co. Ltd., coppersmith and brass founder, 115 Sumach street, Toronto, Ont., advises through A. E. Coulter, secretary, that the subsidiary, Coulter Mfg. Co. Ltd., now being located here, will handle automotive hardware, such as die castings, stampings, electric plating and assembly work. Operations will commence about March, 1931. (Noted Dec. 4.)

TECUMSEH, ONT.—Empire Farm Machinery Co. Ltd. has been incorporated with 400 no par shares by Albert E. Harris to manufacture and deal in farm implements and machinery.

TORONTO, ONT.—Lu-Mac Electric Ltd. has been incorporated with $40,000 capital by Hugh J. MacDonald, 615 Windermere street, to make electrical machinery and appliances.

TORONTO, ONT.—Hubbell Electric & Mfg. Co. Ltd. has been incorporated with 25,000 no par shares by Ernest C. Bogart, Central Life building, to manufacture and deal in electrical goods, heaters and stoves.

TORONTO, ONT.—Campbell Soup Co. Ltd., subsidiary of Campbell Soup Co., Camden, N. J., plans construction of a canning plant, probably at New Toronto, Ont. Eventual construction of a plant for the manufacture of cans is reported.

WINDSOR, ONT.—Fleetway Motors Ltd. has been incorporated with 40,000 no par shares by Walter S. Thompson and Bruce A. E. Clouse, to manufacture and deal in vehicles.

MONTREAL, QUE.—Lynn Canadian Products Ltd., 1111 Beaver Hall hill, whose incorporation recently was noted, advises through H. H. Vaughan, president, that the company will manufacture for Canada the products of the Lynn Products Co., Lynn, Mass. Entire line eventually will be made, with only a few parts supplied from the parent company. Oil burners and other domestic appliances are included. Plant of the General Combustion Co. Ltd., at Brockville, Ont., has been taken over for modification. Initial operations will require 60 employes. (Noted Dec. 4.)

HUMBOLDT, SASK. — Power plant operated by the Saskatchewan Power commission, Regina, Sask., recently was damaged by fire. Plant recently was constructed at a cost of $150,000.

New Trade Publications

PLANER MOTORS—Bulletin No. 207 has been issued by the Reliance Electric & Engineering Co., Cleveland, covering its type T heavy duty planer motors for reversing service. Every part of the motor is illustrated and fully described. Typical installations in planer service are shown in halftones.

POWER PUMPS—Vertical triplex power pumps are illustrated and described in a current bulletin by the Worthington Pump & Machinery Corp., 2 Park avenue, New York. Various types are illustrated and details are shown. Size and data tables are included.

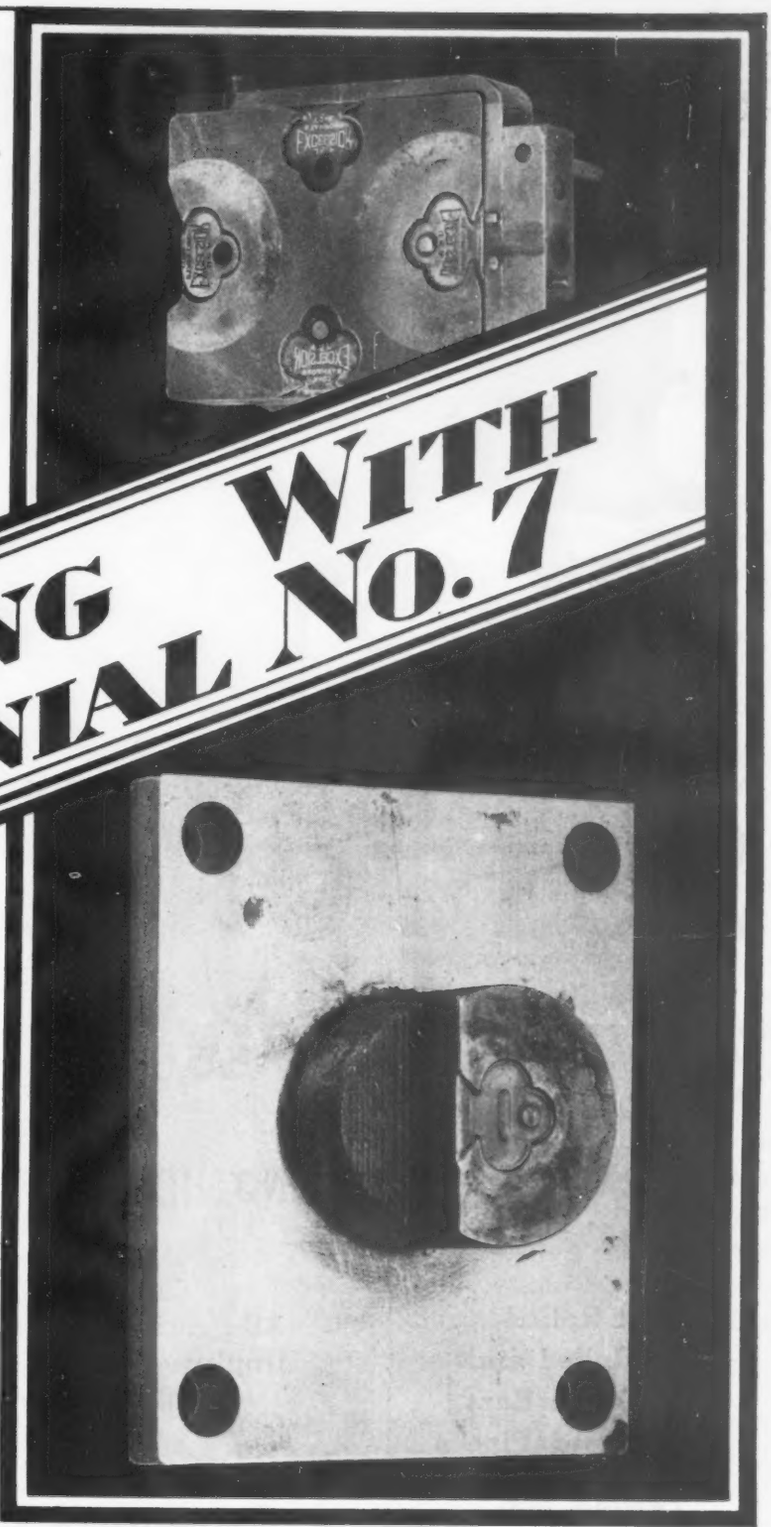
CONVEYING EQUIPMENT—A folder by the Link-Belt Co., Chicago, goes into the history and development of the company since its inception in 1875, with likenesses of its executives, and views of its several plants. Views are also given of installations of its equipment in various materials handling uses.

STEAM GENERATING EQUIPMENT—A revised edition of its general condensed catalog of fuel burning and steam generating equipment, GC-6, has been issued by the Combustion Engineering Corp., New York. It illustrates and briefly describes this class of equipment as supplied by this company. A complete list of products is given.

SPROCKETS—A book prepared by the Link-Belt Co., Chicago, No. 1267, is devoted to sprockets. It contains specifications of sprockets stocked in all standard sizes for immediate delivery. Boring to shaft diameter is the only operation necessary before shipment. The plan of stocking sprockets has been worked out to minimize delay from breakdowns of conveying machinery.

GRINDING MACHINES—Norton Co., Worcester, Mass., manufacturer of grinding equipment, has issued several bulletins on types of its machines. One relates to a carwheel grinding machine, which is fully described and illustrated. Three are devoted to high speed snagging equipment, of 16-inch, 24 and 30-inch floor-stand machines. Equipment for automatic control of speed is also discussed.

COLONIAL No. 7
TOOL STEEL
COLONIAL STEEL COMPANY PITTSBURGH PA.

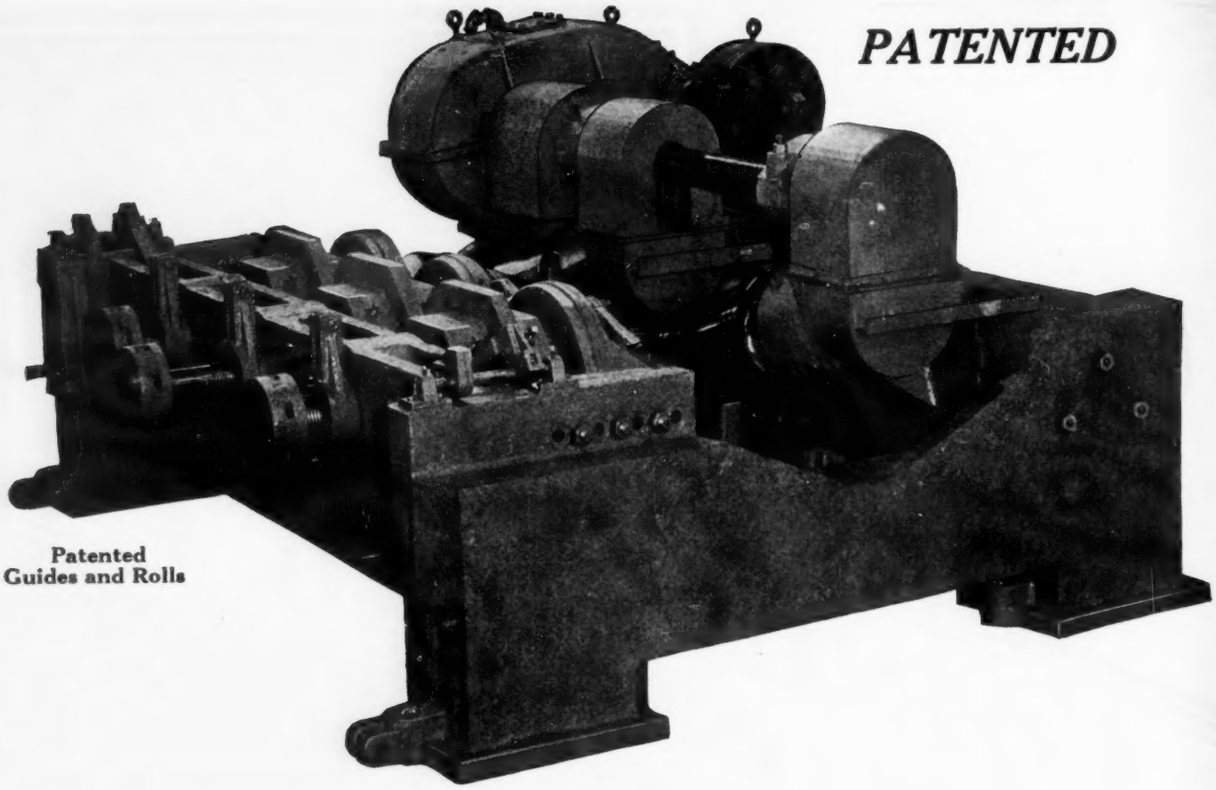


COINING WITH COLONIAL No. 7

Over 500,000 steel keys were coined with this set of dies at the time the photograph was taken.

Colonial No. 7 is a crucible melted steel. Only the purest metal bases obtainable are used. It is manufactured in three tempers.

COLONIAL STEEL COMPANY
PITTSBURGH, PA.



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Round Straightening Machine

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Ferrous and
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Enclosed Helical Gear Drive
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All Bearings Except Drive Rolls Anti Friction Type
Improved Gear Guards—Bevel gears fully enclosed.
Built for Sliding Shoes for Fixed Centre Line
Special Rigid Guide Arrangement

Capacity: 8⅝" to 18½" O. D. Tubes

Speed: 60' to 180' per minute

Write for Bulletin

SUTTON ENGINEERING CO.
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ENDURANCE

THAT SURPASSES ALL EXPECTATIONS

The introduction of Mayari Nickel-Chromium Steels many years ago marked the beginning of a new era in the making of steels to withstand shock and fatigue. These, the first nickel-chromium steels to be used, were found to have an unusually desirable combination of the qualities that make for long life in parts subjected to severe usage.

The Mayari Nickel-Chromium Steels of today are as preeminent among modern steels as were their predecessors among the steels of that time. In addition to the excellence due to their composition they have an added high quality that results from careful supervision of every step of their production by men who have a knowledge of alloy steel manufacture that represents the experience accumulated through the manufacture of nickel-chromium steels for many different industries since these steels first came into use.

You are justified in placing the greatest confidence in Mayari Nickel-Chromium Steels.

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Export Distributor: Bethlehem Steel Export Corporation, 25 Broadway, New York City

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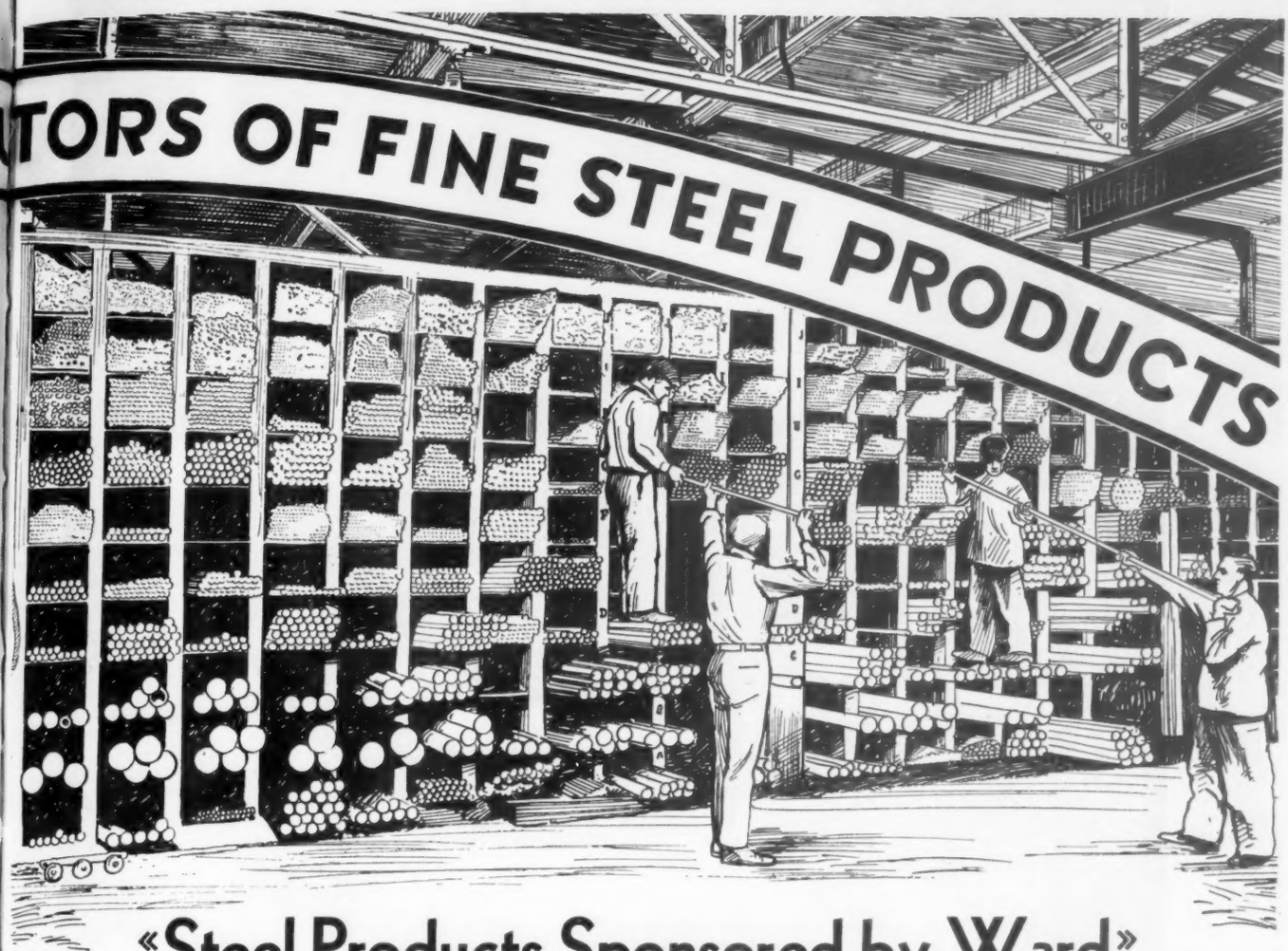

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Certified to Government Specifications

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(Munkfors' Brand)

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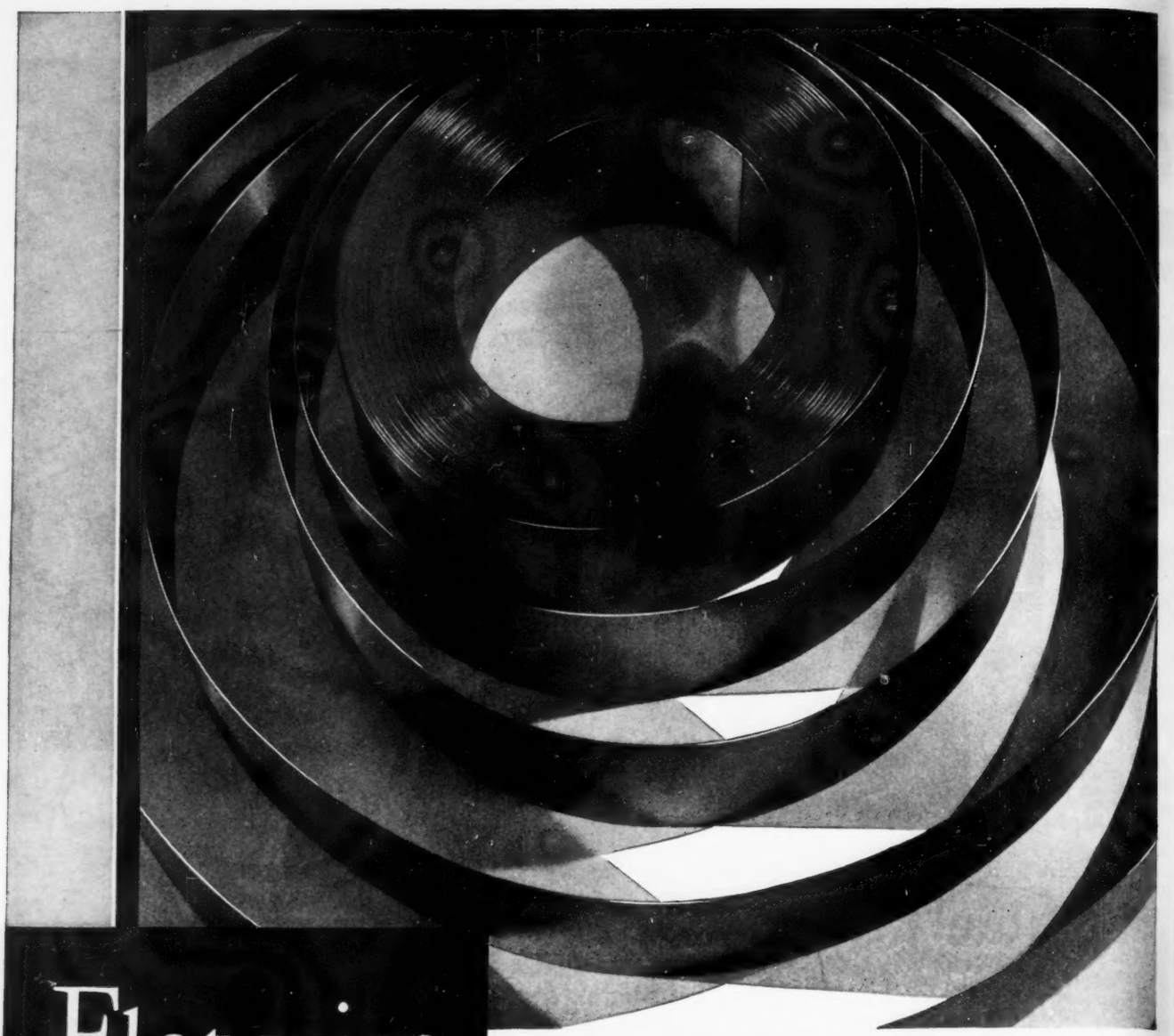

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OUR customers order hundreds of different kinds of flat wire. But common to all of them is this fact:—they are particular.

We attract and hold "hard-to-please" customers because they find that we meet their most exacting flat wire requirements. For years we have specialized in flat wire of the very highest quality and have one of the largest flat wire plants in the country.

Cold rolled high or low carbon steel. Made in various widths, thicknesses and finishes including galvanized and tinned.

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Because Treadwell Hi-Test Iron possesses sufficient strength for a wide variety of casting needs, many manufacturers have effected a welcome reduction in casting costs by specifying Hi-Test in place of more expensive metal.

Treadwell founding service includes castings of Hi-Test Iron, Electric Steel and Alloy Steel.

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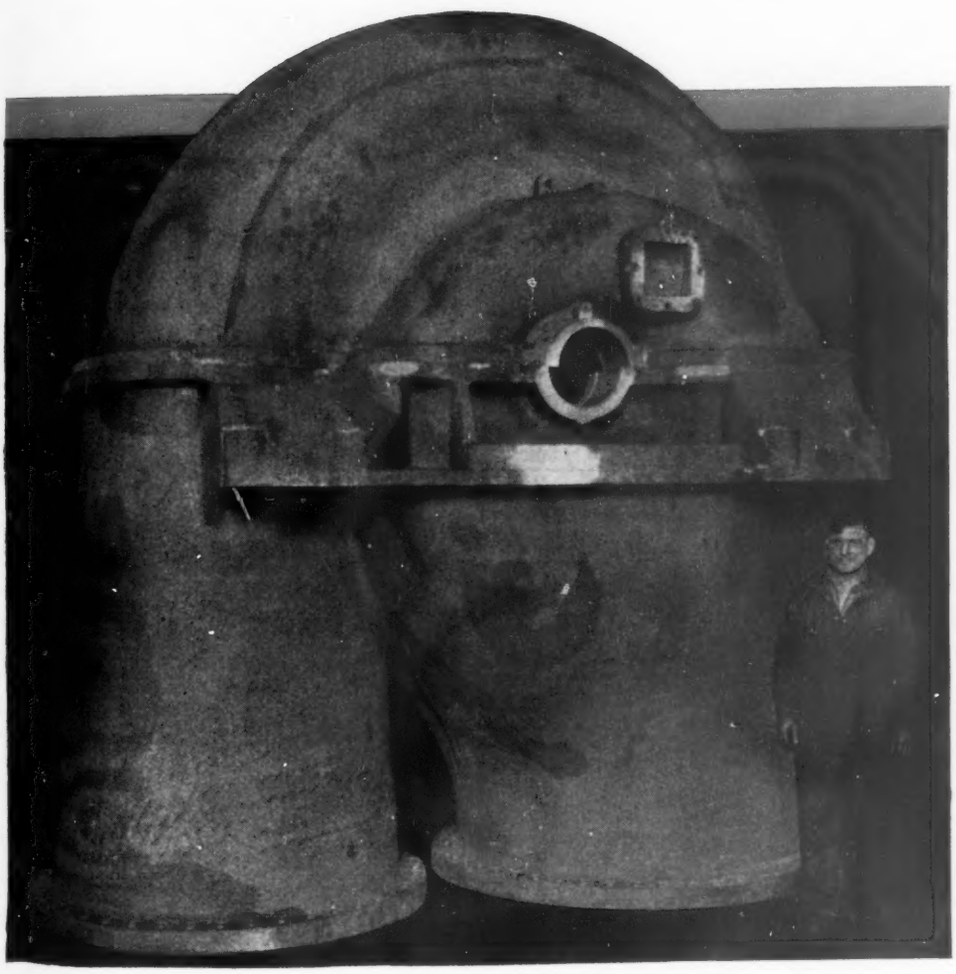

TREADWELL Hi-Test Iron pump casing...tensile strength 42,000 lbs....capacity of this pump will be 120,000,000 gals. per day.

A TEST article—that's what they call a new model airplane—has a big "X" painted on its wings. It's an experimental craft—an unknown quantity. You will find unknown quantities elsewhere in industry too—*but not in Empire bolts and nuts!* Their performance is known—constantly checked, tested, improved—and thus always a little ahead of industry's needs. You play safe by insisting on Empire.

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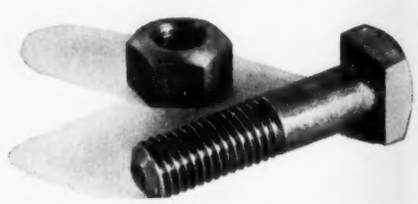

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Subsidiary of United States Steel Corporation

soon will announce
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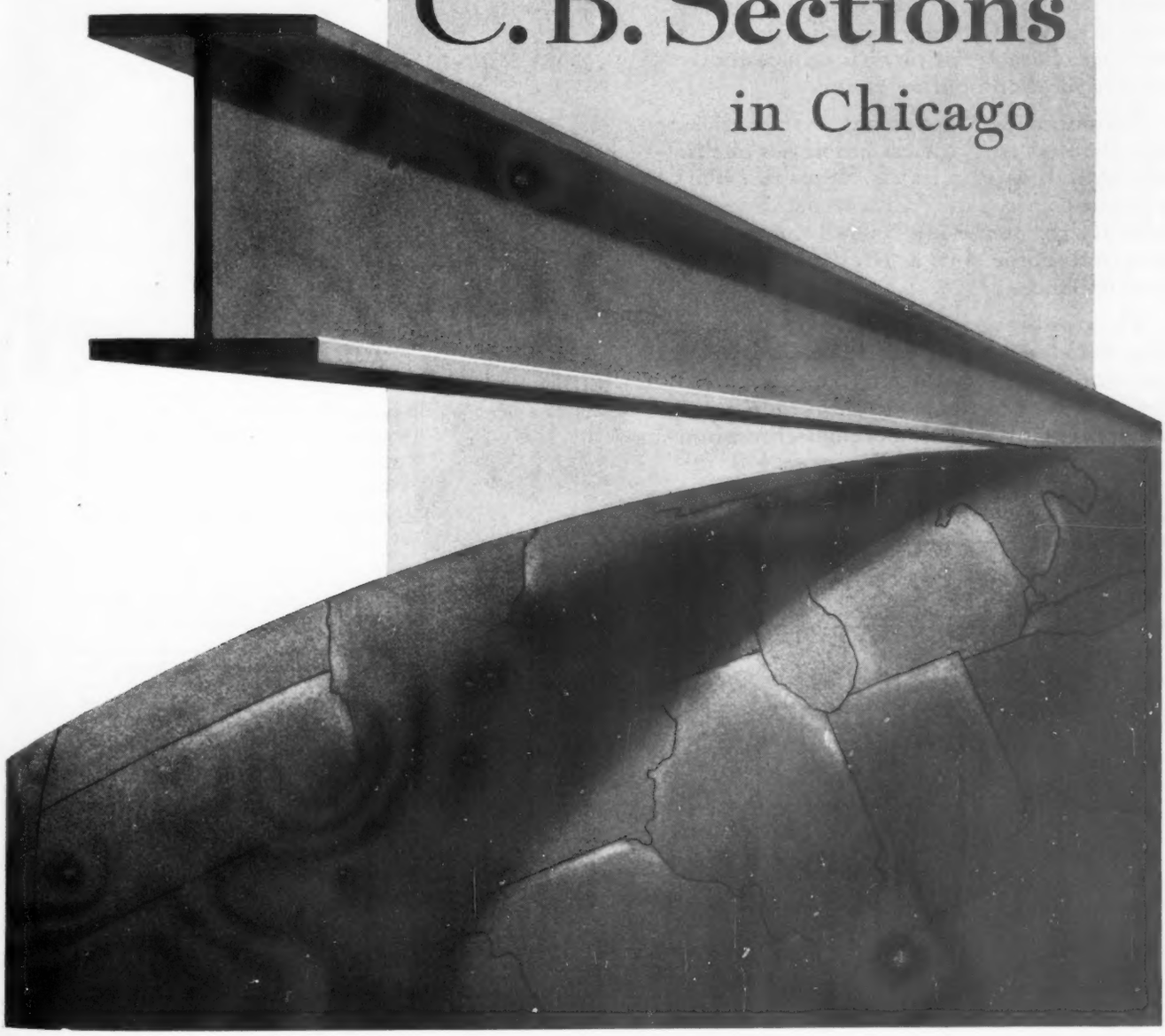

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assure permanent youth to the

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Alloy Steel containing a high percentage of chromium was selected for the major portions of the exterior metal trim on both the Chrysler and Empire State Buildings. Selection of this metal clearly indicates its superiority for maintaining its original characteristics with no possibility of deterioration or other change.

Chromium is the element that provides the stainless and rustless properties of this metal; that assures its resistance to oxidation and atmospheric corrosion; that permits its preserving its full luster and original color for a lifetime without maintenance.

The growing demand for permanency, and the decided trend toward the superior physical and chemical properties imparted by a high percentage of chromium, urge a thorough investigation of high-chromium Alloy Steels. Electromet Engineers will gladly explain how this superior, exterior and interior decorative metal may be produced by the proper use of Ferro-Alloys. Write today.

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This majestic structure rises above Lexington Avenue at 42nd Street, New York. Its beautifully designed tower affords a splendid view of Manhattan and environs within a radius of many miles.

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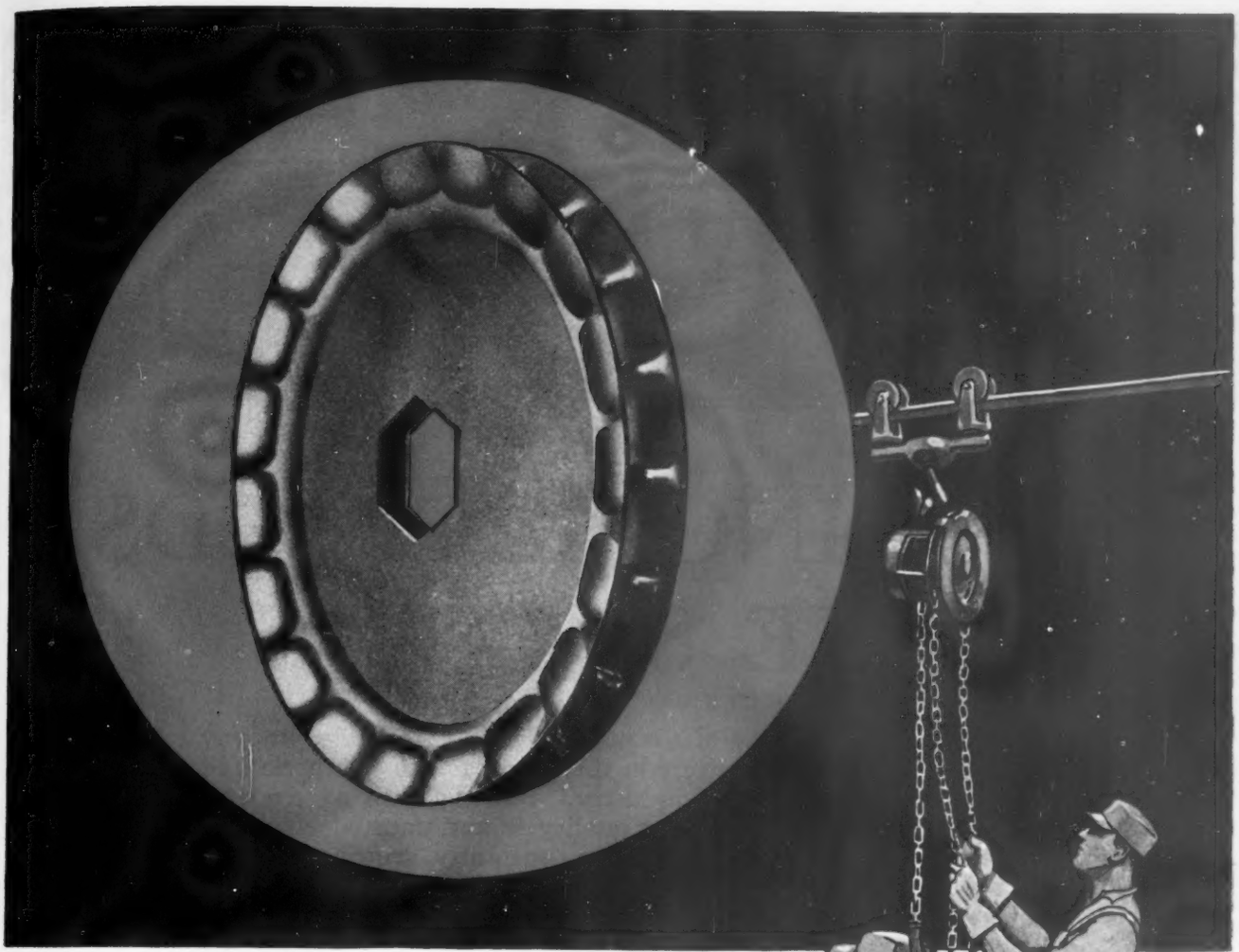

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the stamping you entrust to us will certainly derive economy as well as assurance of satisfactory service—from our background of 33 years devoted exclusively to the designing and manufacturing pressed metal parts.

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CROSBY
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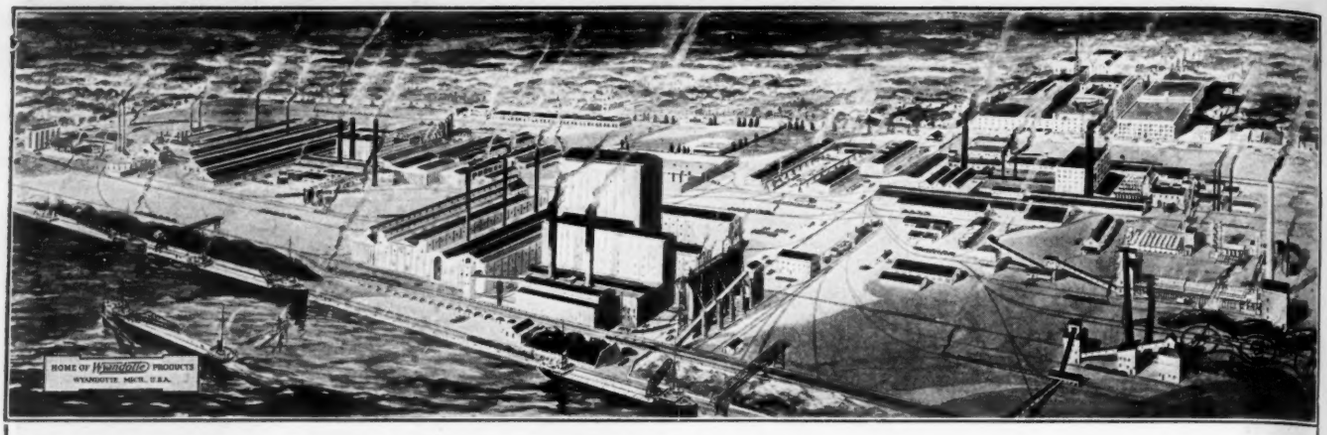

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For more than a third of a century, The J. B. Ford Company has been engaged exclusively in the manufacture of specialized cleaners for commerce and industry. Starting with a comparatively small plant, the superior quality of and unusual efficiency of their products developed such a constantly growing demand that plant after plant has been added until today many acres are covered with huge buildings.

Among products of their manufacture, the

Wyandotte
Clean "Chemically" Clean
Metal Cleaners

have unparalleled success in the industrial field.

That nothing succeeds like success is evident in that manufacturers in the metal industrial world are constantly calling upon the manufacturers of the Wyandotte Metal Cleaners to provide them with the correct cleaners to meet new problems and new conditions in metal cleaning operations.

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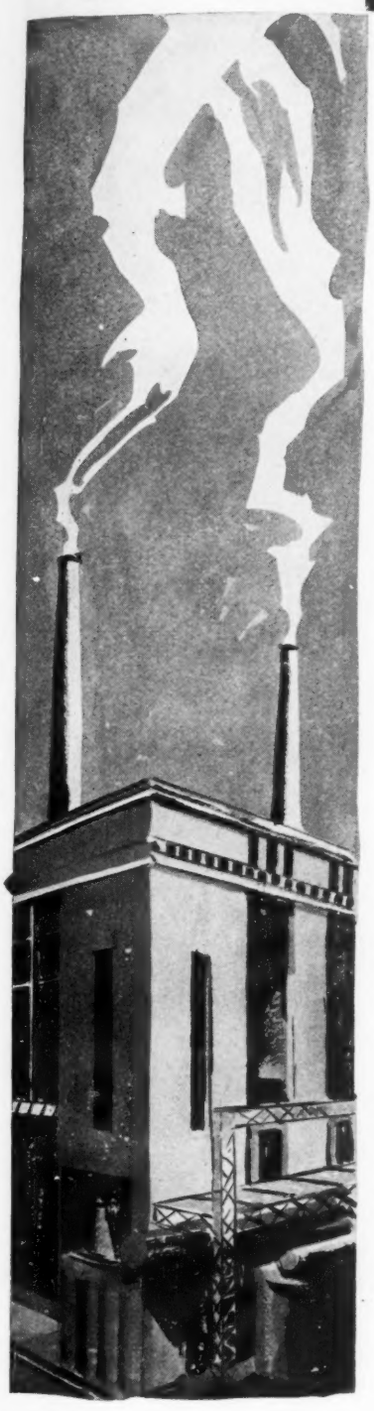
The J. B. Ford Company

SOLE MFRS.

Wyandotte, Michigan

They DO LAST

as good Boiler Tubes should



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Subsidiary of United States Steel Corporation

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SPECIALIZATION brings greater skill and better workmanship in any kind of business. Here a big, modern plant equipped to produce fine cap screws is concentrating its entire energies, time and skill on making them by the Kaufman Method, *patented,* our own plant development. It is not at all strange therefore that the product of our specialization has established a standard of uniform excellence generally recognized by builders of fine machinery.

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YOUNGSTOWN GALVANNEALED SHEETS possess many desirable features besides their ability to withstand seaming and tight pressing without the zinc coating peeling, cracking, scaling and dropping off. They withstand extremely high temperatures (coupled with rapid and complete cooling) without injury to their dull protective coating of zinc, as is evidenced by the results of a test recently completed.

These sheets are easy to work; they resist corrosion; they are readily spot welded; the coating does not chip, flake, peel or crack under high temperatures or during severe fabricating processes; they take paint, lacquer and duco without priming, weathering or chemical treatment, a factor which makes them ideal for all sign work. For complete details of *Youngstown Galvannealed* Sheets, 'phone, write or wire our nearest District Sales Office. Youngstown products are distributed by leading jobbers in all parts of the country.

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NEW YORK—30 Church St., Hudson Terminal Bldg.
PHILADELPHIA—Franklin Trust Bldg.
PITTSBURGH—Oliver Bldg.
SAN FRANCISCO—55 New Montgomery St.
SEATTLE—Central Bldg.
ST. LOUIS—Louderman Bldg.
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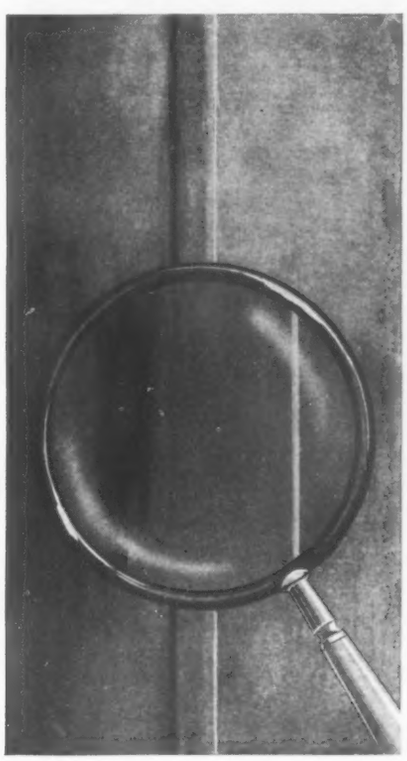
SAVE WITH STEEL

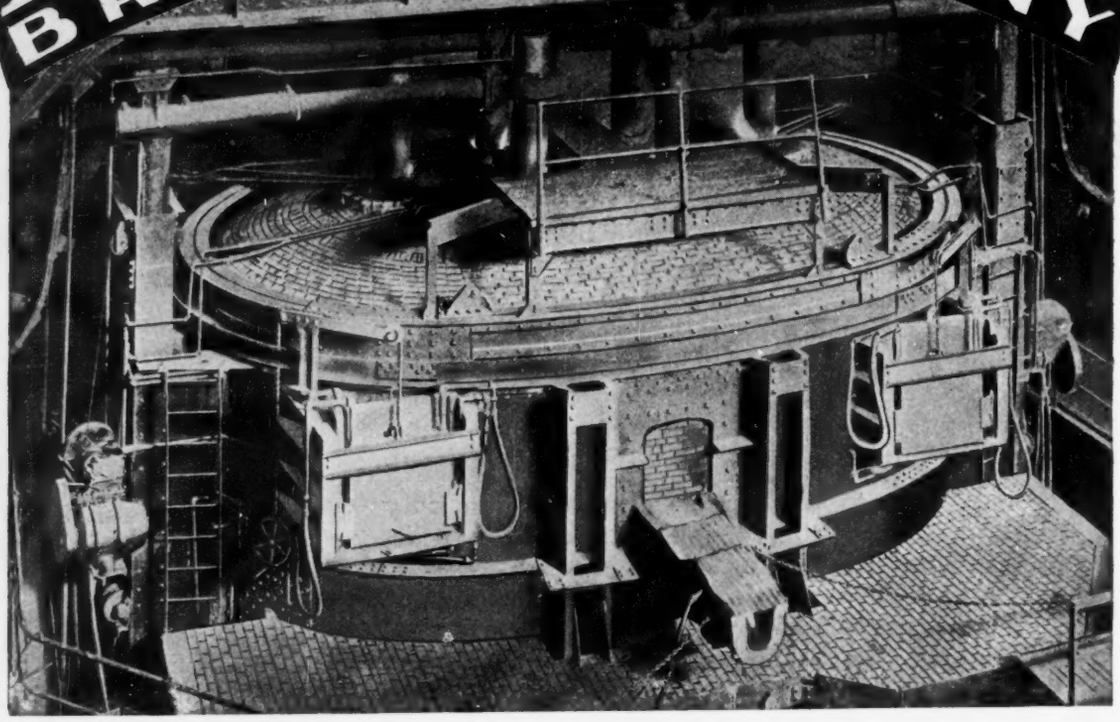
YOUNGSTOWN Galvannealed PROCESS PATENTED SHEETS

The Heat Test and What It Proved

The results of a heat test recently completed to determine the resistance to separation of the base metal and the zinc coating of *Youngstown Galvannealed* Sheets clearly demonstrates the unusual bonding which has been effected between the protective coating and the base metal of this sheet. Cylinders formed of these sheets were heated to 600 degrees F. for 8 hours—then allowed to cool for 16 hours—this process was continued for 14 days and at the end of this severe test there was no trace of deterioration. The photograph below shows a cylinder made from a *Youngstown Galvannealed* Sheet at the end of this test. This photograph graphically illustrates the bonding which has taken place through the patented process used in applying the zinc coating to *Youngstown Galvannealed* Sheets.



AMERICAN BRIDGE COMPANY



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In sizes ½, 1, 1½, 2, 3, 7, 10, 15, 25, 40 and 100 Ton Capacities

DESIGNED for open-top, chute, machine or hand charging . . .

EQUIPPED with high-powered transformers and multiple voltage control to give maximum efficiency and low production costs . . .

CONSTRUCTED substantially for economical production of steels and other ferrous materials by either basic or acid process . . .

Your inquiries on the Heroult Electric Furnace will be given special attention with the view of recommending a design most suitable to meet local conditions and desired production.

We are also builders of the Screw Lift Type Heroult Electric Furnace

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Buffalo, N. Y.
7,600 TONS OF STEEL
By
McClintic-Marshall

"That sample of steel that Stanley sent us works out just right"

Steel may do the work just as well as the more expensive material you are now using.

—years of experience in rolling steel for thousands of articles,

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—a cherished reputation for producing steel of uniform quality,

—and production facilities capable of guaranteeing delivery "on time."

These are some of the reasons why Stanley Steel is being increasingly specified wherever blanking, bending and drawing are major operations.

Inquiries relative to steel specifications will be given our prompt attention

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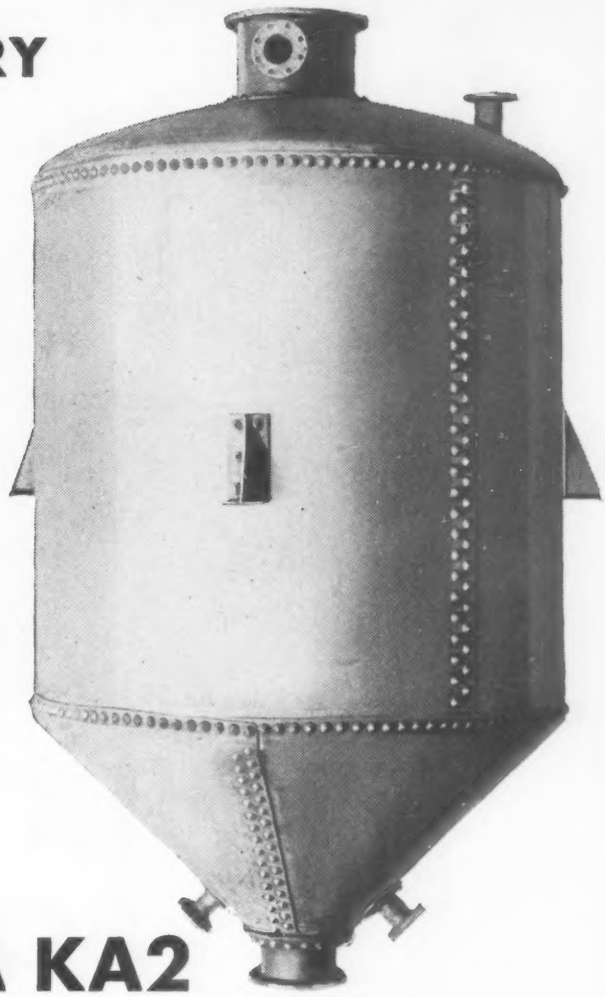
Hot and Cold Rolled

THE CHEMICAL INDUSTRY TURNS TO... ENDURO

for corrosion control



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... the perfected stainless steel

ENDURO NIROSTA KA2, the perfected alloy processed according to patented Krupp specifications, is resistant to a wider range of corrosive media encountered in the chemical and process industries, than any other alloy.

■ Some indication of the trend toward this improved alloy of high-strength and ductility is gained from its rapidly growing applications where corrosion is most severe. Acid shipping drums, cracking still tubes, digesters, condensers, storage tanks, acid piping, and countless other chemical plant equipment is now fabricated from ENDURO.

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Central Alloy Division

REPUBLIC STEEL
CORPORATION
Massillon, Ohio

Model 24-P ejection type press, having box 100" long, 20" wide, 42" deep. Finished bales measure 20" x 14" x 14" minimum. Can be equipped with power operated loading hopper.

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Hydraulically compressed scrap commands at all times the *best price,* and can be conveniently stored and held for favorable markets; it is easily handled; it practically eliminates corrosion; it saves much time in remelting; cars can be easily loaded to capacity.

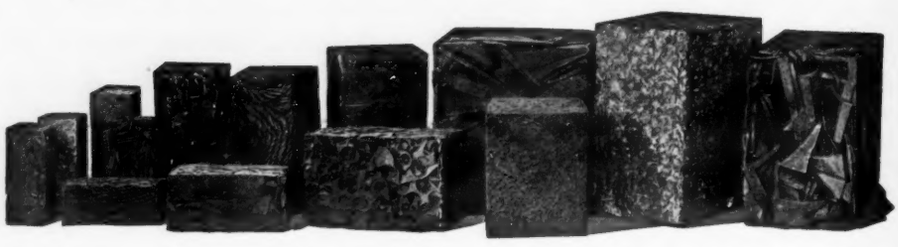
***LOGEMANN Presses* are built in several types and sizes to suit all requirements.**

You cannot go wrong on a LOGEMANN—it's a money maker from the day it is set in operation.

PIONEERS!

LOGEMANN Scrap Metal Presses, pioneers in this industry, enjoy an enviable reputation for long life and economical operation. They are in daily use in practically every large sheet mill, stamping plant, scrap yard, and in metal-working establishments of all kinds.

Our many years of accumulated experience, and services of our Engineering Department are at the disposal of all plants accumulating metal scrap of any kind.



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UP TO 10000 H. P.

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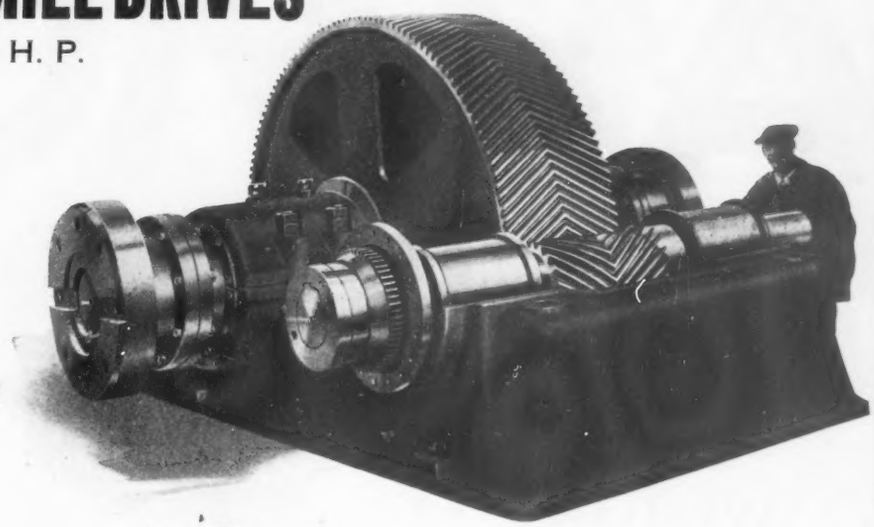
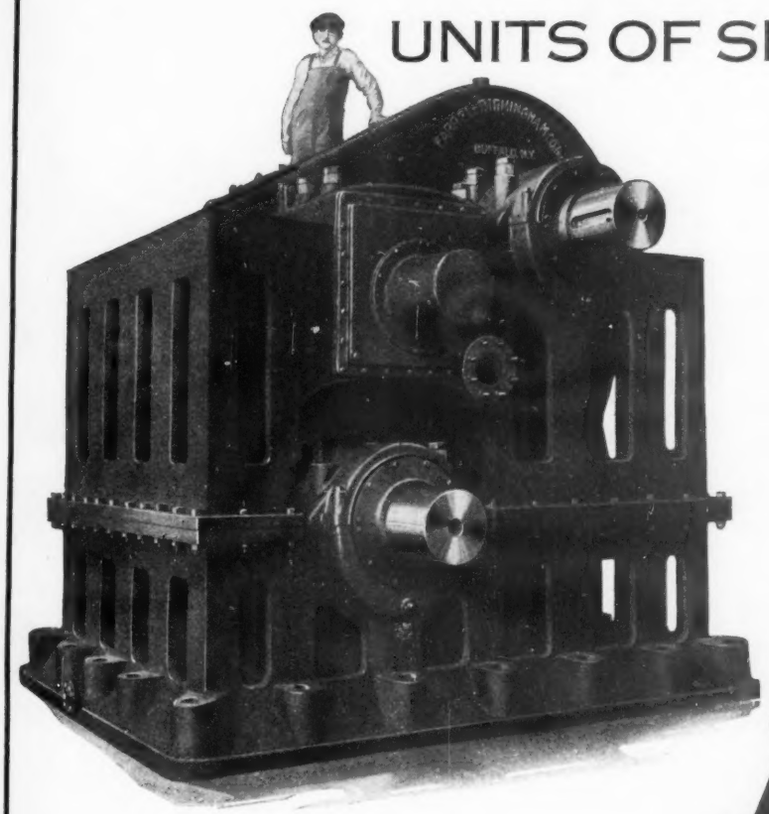
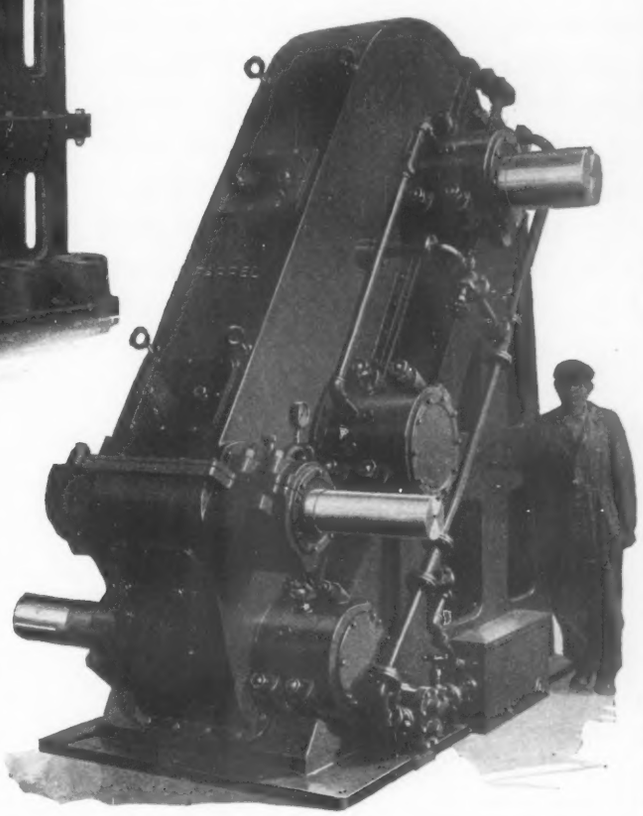


UNITS OF SPECIAL DESIGN



When local conditions necessitate units of special design it is generally profitable to submit the problem to our engineering department. Not only is a specialist knowledge desirable but we may have already solved the problem and have drawings and patterns which will, of course, reduce the initial cost.



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45		125 tons
30		150 tons
3	WORM DRIVEN Ladle,	150 tons
6	WORM DRIVEN Ladle,	160 tons
2	WORM DRIVEN Ladle,	165 tons
4	WORM DRIVEN Ladle,	175 tons
27		175 tons
3	WORM DRIVEN Ladle,	200 tons
4		200 tons
5		225 tons
1		250 tons
3	WORM DRIVEN Ladle,	250 tons
3	WORM DRIVEN Ladle,	275 tons
1		275 tons
1		300 tons
3		430 tons

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21		150 tons
19		200 tons
1	Single Ram,	320 tons

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4		200 tons

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Section M-41

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Width —6" to 72".
Length —240" maximum for all gauges and widths.

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Subsidiary of UNITED STATES STEEL CORPORATION

General Offices: 208 South La Salle Street, Chicago, Illinois

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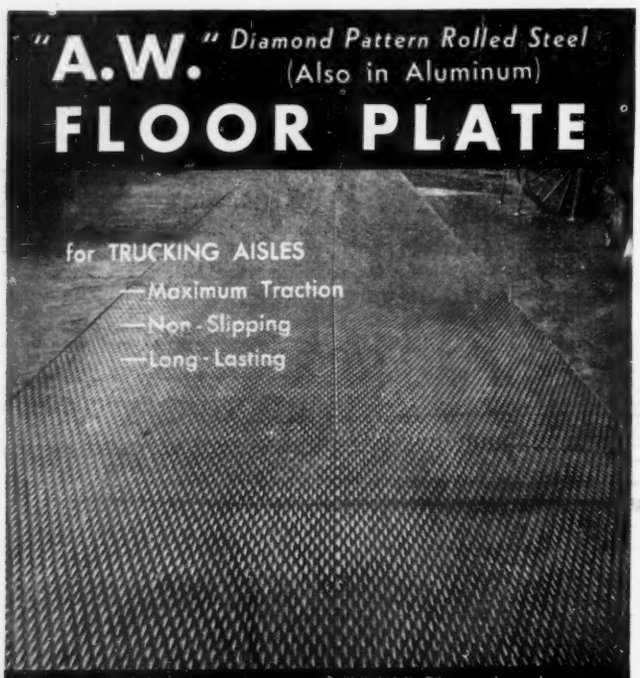
FLOOR PLATE



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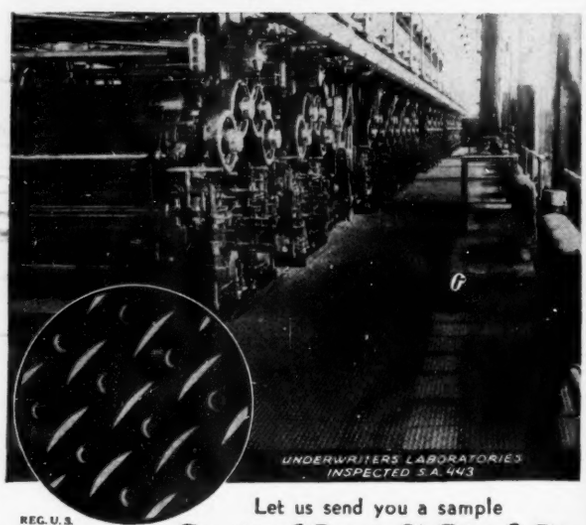

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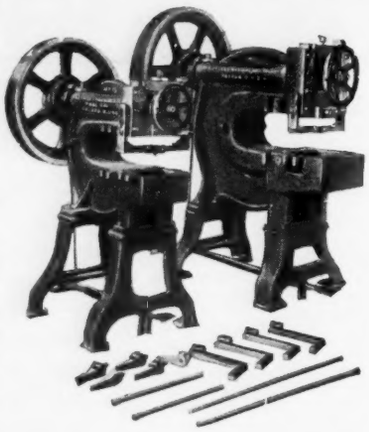

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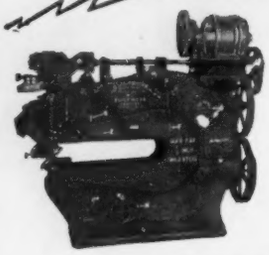

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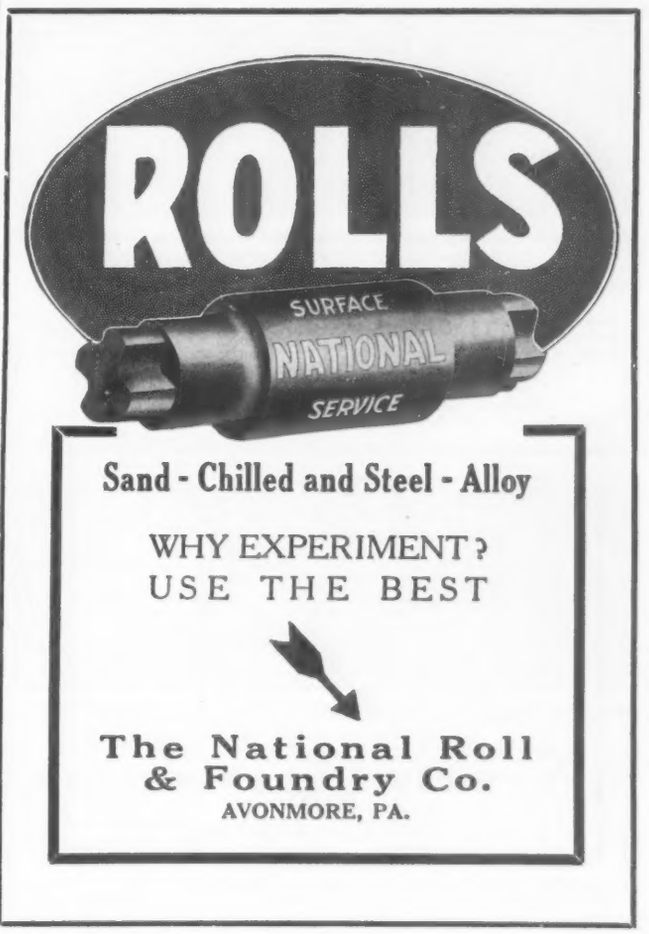

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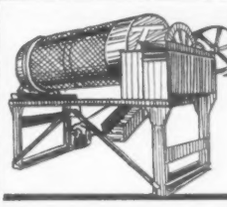
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MANIFOLDS (Oxygen)
Air Reduction Sales Co., Lincoln Bldg., E. 42nd St., New York City.
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

MATERIAL HANDLING MACHINERY
Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland

METAL (Perforated)—See PERFORATED METAL

METAL CLEANERS
American Chemical Paint Co., Ambler, Pa.
Ford, The J. B., Co., Wyandotte, Mich.

METAL SPECIALTIES AND PARTS—See STAMPINGS

METAL STAMPINGS—See STAMPINGS

METAL WORKING MACHINES—See SHEET METAL WORKING MACHINERY

METALS (Nonferrous)
International Nickel Co., 67 Wall St., New York City.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

METERS (Gas and Air)
Cutler-Hammer, Inc., 1265 St. Paul Ave., Milwaukee, Wis.

MILLS (Blooming, Universal, Plate, Sheet, Tin, Bar)—See ROLLING MILL EQUIPMENT

MIXING, KNEADING, TEMPERING AND PUGGING MACHINERY
Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland

MOLDING MACHINES
Herman Pneumatic Mach. Co., 806 Union Bk. Bldg., Pittsburgh, Pa.

MOLDING MACHINES (Tractor Type Sand Throwing)
Beardsley & Piper Co., 2541 N. Keeler Ave., Chicago.

MOLDS (Ingot)—See INGOT MOLDS

MOLYBDENUM
Vanadium Corp. of Amer., 120 Broadway, New York City.

MONEL METAL (All Commercial Forms)
International Nickel Co., 67 Wall St., New York City.

MONORAIL SYSTEMS
Box Crane & Hoist Corp., Janney & E. Ontario St., Philadelphia.

MOTORS (Electric)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Century Electric Co., 1806 Pine Ave., St. Louis, Mo.
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Cleveland, O., Dept. 20-12
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland, O.
Reliance Electric & Engr. Co., 1082 Ivanhoe Rd., Cleveland, O.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

MUCK BAR
Bethlehem Steel Co., Bethlehem, Pa.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia.

NAILS
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Steel Co., P.O. Box 72, Pittsburgh, Pa.
Youngstown Sheet & Tube Co., The, Youngstown, O.

NAILS (Coated and Galvanized)
American Steel & Wire Co., 208 S. LaSalle St., Chicago.
Youngstown Sheet & Tube Co., The, Youngstown, O.

NICKEL (All Commercial Forms)
International Nickel Co., 67 Wall St., New York City.

NICKEL (Shot)
International Nickel Co., 67 Wall St., New York City.

NICKEL STEEL (Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.

NITROGEN (Gas)
Linde Air Products Co., 30 E. 42nd St., New York City.

NUTS
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Cap Screw Co., The, 2934 E. 79th St., Cleveland, O.
Neely Nut & Bolt Co., 2101 Wharton St., Pittsburgh.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh.
Pittsburgh Screw & Bolt Corp., Preble Ave., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Rhode Island Tool Co., Providence, R. I.
Rockford Bolt Co., 220 Mill St., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

OPEN-HEARTH FURNACES—See FURNACES (Open Hearth)

OVENS (Coke, By-Product Recovery)
Koppers Const. Co., The, 1301 Koppers Bldg., Pittsburgh.

OXY-ACETYLENE WELDING AND CUTTING—See WELDING

WHERE-TO-BUY

OXYGEN IN CYLINDERS
Air Reduction Sales Co., Lincoln Bldg., E. 42nd St., New York City.
Linde Air Products Co., 30 E. 42nd St., New York.

PAINTING (Industrial)
Kiefer Sheeting & Painting Co., House Bldg. Pittsburgh, Pa.

PERFORATED METAL
Chicago Perforating Co., 2445 W. 24th Place, Chicago.
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Harrington & King Perforat- Co., 5634 Fillmore St., Chicago.
Hendrick Mfg. Co., 43 Dundaff St., Carbondale, Pa.
Mundt, Chas., & Sons, 55 Fairmount Ave., Jersey City, N. J.

PICKLING COMPOUND
American Chemical Paint Co., Ambler, Pa.
Hearne, Wm. M., Inc., 814 Pennsylvania Bldg., Philadelphia.

PICKLING EQUIPMENT
International Nickel Co., 67 Wall St., New York City.
Weaver Bros. Co., Adrian, Mich.

PICKLING MACHINERY
Aetna-Standard Engr. Co., The, Youngstown, O.
Mesta Machine Co., P. O. Box 1124, Pittsburgh.

PICKLING TANKS
Hauser-Stander Tank Co., Cincinnati, O.
Weaver Bros. Co., Adrian, Mich.

PIG IRON
Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Chateaugay Ore & Iron Co., 26 Liberty St., New York.
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland.
Globe Iron Co., Jackson, O.
Hanna Furnace Corp., Detroit, Mich.
Illinois Steel Co., 208 So. LaSalle St., Chicago.
Pickands, Mather & Co., Union Trust Bldg., Cleveland.
Pilling & Co., Inc., 1500 Chestnut St., Philadelphia.
Republic Steel Corp., Youngstown, O.
Rogers Brown & Crocker Bros., Inc., 21 E. 40th St., New York.
Snyder, W. P. & Co., Oliver Bldg., Pittsburgh, Pa.
Valley Mould & Iron Corp., Hubbard, Ohio.

PIG IRON (Charcoal)
Superior Charcoal Iron Co., Grand Rapids, Mich.

PILING (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.

PINIONS—See GEARS AND GEAR CUTTING

PIPE (Acid Resisting)
Duriron Co., Inc., Dayton, O.

PIPE (Seamless Steel and Seamless Iron)
Babcock & Wilcox Tube Co., Beaver Falls, Pa.

PIPE (Steel)
Babcock & Wilcox Tube Co., Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh.
Michigan Steel Tube Products Co., Buffalo St., Detroit, Mich.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Petroleum Iron Works Co., Sharon, Pa.
Pittsburgh Steel Products Co., Union Trust Bldg., Pittsburgh.
Republic Iron & Steel Co., Youngstown, O.
Youngstown Sheet & Tube Co., The, Youngstown, O.

PIPE (Wrought Iron)
Reading Iron Co., Reading, Pa.

PIPE (Wrought Steel)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

PIPE BALLS (Steel, Welding)
Damascus Steel Casting Co., New Brighton, Pa.

PIPE CUTTING & THREADING MACHINERY
Aetna-Standard Engr. Co., The, Youngstown, Ohio.
Landis Machine Co., Waynesboro, Pa.
Treadwell Engineering Co., Easton, Pa.

PIPE FITTINGS
Pittsburgh Piping & Equip. Co., 43rd St. & A. V. R. R., Pittsburgh.

PIPE LINES (Riveted & Welded)
McClintic-Marshall Co., Oliver Bldg., Pittsburgh.

PIPE MILL MACHINERY
Aetna-Standard Engr. Co., The, Youngstown, Ohio.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Treadwell Engineering Co., Easton, Pa.
Yoder Co., The, W. 55th & Walworth Ave., Cleveland, O.

PIPE STRAIGHTENING MACHINERY
Aetna-Standard Engr. Co., The, Youngstown, Ohio.
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.
Sutton Engr. Co., Park Bldg., Pittsburgh, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Treadwell Engineering Co., Easton, Pa.

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Pittsburgh Piping & Equip. Co., 43rd St. & A. V. R. R., Pittsburgh.
Power Piping Co., 829 Beaver Ave., Pittsburgh, Pa.

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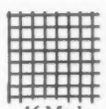
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Heppenstall Co., 47th and Hatfield, Pittsburgh.

PLANERS AND SHAPERS
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.

PLATE CASTORS
Hyatt Roller Bearing Co., Harrison, N. J.

PLATES (Iron and Steel)
American Rolling Mill Co., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.

PLATES (Manganese Steel)
Taylor-Wharton Iron & Steel Co., Easton, Pa.

PLATES (Steel—Floor)—See FLOORING (Steel)

PLATES (Sheared and Universal)
Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City Steel Co., Granite City, Ill.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago.
Inland Steel Co., 38 So. Dearborn St., Chicago.
Ryerson, Joseph T., & Son, Inc., 16th & Rockwell Sts., Chicago.
Youngstown Sheet & Tube Co., The, Youngstown, O.

PLATES (Terne and Tin)—See TIN PLATE

PNEUMATIC TOOLS—See TOOLS (Pneumatic)

POLE LINE HARDWARE
Oliver Iron & Steel Corp., S. 10th & Muriel, Pittsburgh.

POLES (Tubular Steel)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

PORCELAIN ENAMELING EQUIPMENT
Ferro Enamel Corp., The, Keith Bldg., Cleveland.

PORCELAIN ENAMELS
Ferro Enamel Corp., The, Keith Bldg., Cleveland.

POTS (Salt, Lead, Cyanide)
Case Hardening Service Co., 2280 Scranton Rd., Cleveland.
Farrell-Cheek Fdry Co., Sandusky, O.
Lebanon Steel Corp., Lebanon, Pa.

POWDERED COAL EQUIPMENT
Fuller Lehigh Co., Fullerton, Pa.

PREHEATERS
Blaw-Knox Co., 2002 Farmers Bank Bldg., Pittsburgh, Pa.

PREHEATING APPARATUS
Oxweld Acetylene Co., 30 E. 42 St., New York City.

PRESSED METAL—See STAMPINGS

PRESSES
Cleveland Punch & Shear Wks Co., The, 3917 St. Clair Ave., Cleveland.
Erie Fdry. Co., Erie, Pa.
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.
Niagara Mach. & Tool Wks., 637-697 Northland Ave., Buffalo, N. Y.
Toledo Mach. & Tool Co., Toledo, O.

PRESSES (Die Cutting)
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.

PRESSES (Forging)
Mesta Machine Co., P. O. Box 1124, Pittsburgh.
Morgan Engr. Co., Alliance, O.
United Engr. & Fdry. Co., Farmers Bk. Bldg., Pittsburgh.

PRESSES (Hydraulic)
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Farrel-Birmingham Co., Inc., 344 Vulcan St., Buffalo, N. Y.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee.
Mesta Machine Co., P. O. Box 1124, Pittsburgh.
Morgan Engr. Co., Alliance, O.
Wood, R. D., & Co., 400 Chestnut St., Philadelphia.

PRESSES (Metal Drawing, Etc.)
Bliss, E. W., Co., 53rd St. & 2nd Ave., Brooklyn, N. Y.

PRESSES (Roofing and Corrugating)
Streine Tool & Mfg. Co., New Bremen, O.

PRESSES (Scrap Bundling and Baling)
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.

PRESSES (Straightening)
United Engr. & Fdry. Co., Farmers Bk. Bldg., Pittsburgh.

PRODUCER GAS SYSTEMS —See GAS PRODUCER PLANTS

PULLEYS (Friction Clutch)
Johnson, Carlyle, Machine Co., The, Manchester, Conn.

PULVERIZING, CRUSHING & GRINDING MACHINERY—See CRUSHING, GRINDING & PULVERIZING MACHINERY

PUMPS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

PUMPS (Acid Resisting)
Duriron Co., Inc., Dayton, O.

PUMPS (Centrifugal)
Allis-Chalmers Mfg. Co. Milwaukee, Wis.
Ingersoll-Rand Co., (Cameron), 11 Broadway, New York City.

PUMPS (Chemical Proportioning)
Hills-McCanna Co., 2051 Nelson St., Chicago.

PUMPS (Hand and Power)
Myers, F. E., & Brother Co., The, Ashland, O.

PUMPS (Hydraulic)
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.
Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

WHERE-TO-BUY

PUNCHES (Multiple)
Cleveland Punch & Shear Wks. Co., 3917 St. Clair Ave., Cleveland.

PUNCHING AND SHEARING MACHINERY
Beatty Machine & Mfg. Co., Hammond, Ind.
Cleveland Punch & Shear Wks. Co., 3917 St. Clair Ave., Cleveland.
Long & Allstatter Co., Hamilton, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh.

PURIFIERS (Steam)
Blaw-Knox Co., 2002 Farmers Bank Bldg., Pittsburgh, Pa.

RAILS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.

REAMERS
Cleveland Twist Drill Co., 1242 E. 49 St., Cleveland, O.

REFRACTORIES
Carborundum Co., Perth Amboy, N. J.
Climax Fire Brick Co., Climax, Pa.
Eureka Fire Brick Works, First Nat. Bank Bldg., Pittsburgh, Pa.
General Refractories Co., 106 S. 16th St., Philadelphia, Pa.
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Kier Fire Brick Co., Oliver Bldg., Pittsburgh.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia.
North American Refractories Co., 1012 Nat. City Bldg., Cleveland.
Norton Co., Worcester, Mass.
Stowe-Fuller Refractories Co., The, 2008 Union Trust Bldg., Cleveland, O.

REGISTERS (Heating and Ventilating)
Auer Register Co., The, 3608 Payne Ave., Cleveland.

REGULATORS (Compressed Gas)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

REGULATORS (Pressure)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

RESISTORS (Edgewound)
Clark Controller Co., The, 1146 E. 152nd St., Cleveland.

RHEOSTATS
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland.

RINGS (Steel)
Heppenstall Co., 47th & Hatfield, Pittsburgh.

RINGS (Weldless)
Milwaukee Forge & Mach. Co., 1532 E. Oklahoma Ave., Milwaukee, Wis.

RIVETERS (Pneumatic)
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland.
Hanna Engr. Wks., 1765 Elston Ave., Chicago.

RIVETING MACHINERY
Hanna Engr. Wks., 1765 Elston Ave., Chicago.
Shuster, F. B., Co., New Haven, Conn.
Wood, R. D., & Co., 400 Chestnut St., Philadelphia.

RIVET HEATERS (Electric)
American Car & Foundry Co., 30 Church St., New York City.

RIVET SETS
Cleveland Punch & Shear Wks. Co., 3917 St. Clair Ave., Cleveland.

RIVET SETS AND CHISEL BLANKS
Hunter Saw & Mach. Co., 5656 Butler St., Pittsburgh.

RIVETS
Bethlehem Steel Co., Bethlehem, Pa.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago.
Neely Nut & Bolt Co., 2101 Wharton St., Pittsburgh, Pa.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh.
Pittsburgh Screw & Bolt Corp., Preble Ave., Pittsburgh, Pa.
Progressive Mfg. Co., Torrington, Conn.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Joseph T., & Son, Inc., 16th and Rockwell Sts., Chicago.

RODS (Drill)
Globe Wire Co., Sharpsburg, Pa.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.

RODS (Rounds, Flats & Shapes)
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Pittsburgh Screw & Bolt Corp., Preble Ave., Pittsburgh, Pa.
Washburn Wire Co., Phillipsdale, R. I.

RODS (Welding)—See **WELDING RODS**

RODS (Wire)—See **WIRE PRODUCTS**

ROLLING DOORS AND SHUTTERS
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ROLLING MILL BEARINGS
Hyatt Roller Bearing Co., Harrison, N. J.
Norma-Hoffman Bearings Corp., Stamford, Conn.

ROLLING MILL EQUIPMENT
Alliance Machine Co., The, Alliance, O.
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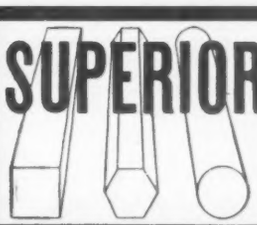
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Lewis Fdry. & Mach. Co., P. O. Box 1591, Pittsburgh.
Mackintosh-Hemphill Co., Penn Ave. at Water St., Pittsburgh, Pa.
Mesta Mach. Co., P. O. Box 1124, Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Morgan Engr. Co., Alliance, O.
National Roll & Fdry. Co., Avonmore, Pa.
Streine Tool & Mfg. Co., New Bremen, O.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engr. & Fdry. Co., Farmers Bk. Bldg., Pittsburgh.
Wean Engineering Co., 2nd Nat. Bk. Bldg., Warren, O.
Yoder Co., The, W. 55th & Walworth Ave., Cleveland, O.

ROLLING MILLS (Consulting, Contracting Engineers)

McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.

ROLLS (Sand and Chilled)

Aetna-Standard Engr. Co., The, Youngstown, O.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Mesta Mach. Co., P. O. Box 1124, Pittsburgh.

ROLLS (Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Heppenstall Co., 47th & Hatfield, Pittsburgh.
Hyde Park Fdry & Mach. Co., Hyde Park, Pa.
Mackintosh-Hemphill Co., Penn Ave. at Water St., Pittsburgh, Pa.
Mesta Mach. Co., P. O. Box 1124, Pittsburgh.
Midvale Co., Nicetown, Philadelphia, Pa.
National Roll & Fdry. Co., Avonmore, Pa.
Pittsburgh Rolls Corp., 41st & A. V. R. R., Pittsburgh.
United Engr. & Fdry. Co., Farmers Bk. Bldg., Pittsburgh.

ROOFING AND SIDING (Corrugated and Plain)

American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh.
Bethlehem Steel Co., Bethlehem, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago.
Republic Steel Corp., Youngstown, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

ROOFING AND SIDING (Erection and Repairs)

Kiefer Sheeting & Painting Co., House Bldg. Pittsburgh, Pa.

ROOFS (Open Hearth & Heating Furnaces)

Detrick, M. H., Co., 140 S. Dearborn St., Chicago.

SAFE ENDS (Boiler Tube)

National Tube Co., Frick Bldg., Pittsburgh, Pa.

SAFETY DEVICES (Electric)

Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland.

SAND—SILICA (Furnace Bottom & Hot Top)

Industrial Silica Corp., 602 Stambaugh Bldg., Youngstown, O.

SAND—SILICA (Steel Molding, Core, Sandblast)

Industrial Silica Co., 602 Stambaugh Bldg., Youngstown, O.

SANDBLAST ABRASIVE (Shot and Grit)

Pittsburgh Crushed Steel Co., 61st & A. V. R. R., Pittsburgh, Pa.

SANDBLAST EQUIPMENT AND ACCESSORIES

Pangborn Corp., P. O. Box 858, Hagerstown, Md.

SAND CONDITIONING AND PREPARING MACHINERY

Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland.
Beardsley & Piper Co., 2541 N. Keeler Ave., Chicago.
National Engr. Co., 549 W. Washington Blvd., Chicago.

SAND CONVEYING AND HANDLING MACHINERY

Bartlett, C. O., & Snow Co., 6203 Harvard, Ave., Cleveland.
Beardsley & Piper Co., 2541 N. Keeler Ave., Chicago.
Link-Belt Co., 300 W. Pershing Rd., Chicago.
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SHAPES (Steel)—See STEEL (Structural)

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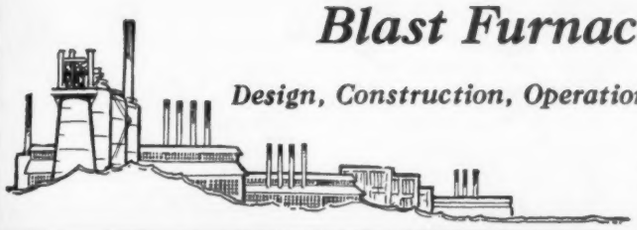

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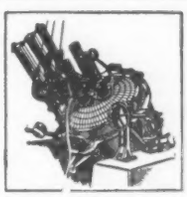

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Republic Steel Corp., Youngstown, O.
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Weirton Steel Co., Weirton, W. Va.

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Latrobe Electric Steel Co., Latrobe, Pa.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell St., Chicago.
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STEEL PLATES—See PLATES

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FULL CAPACITY

3/4 CAPACITY

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Running your plant at one-half or two-thirds capacity can you still make a profit? Where is YOUR profit zone?

Some plants can "get by" in times of heavy demand, that cannot survive today when fractional capacity operations are necessary. Cutting corners—savings on given machines or in given departments . . . are always desirable. But that's not enough.

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No miracle makers . . . but engineers who are unusually progressive in developing ideas and pointing the way to profitable action. An interview granted, with permission to look over your facilities, will cost you nothing—may lead to unexpected decisions on your part . . . decisions which will have an all-important bearing on your profits for 1931 and for some years to come.

A new booklet, just off the press, "101 QUESTIONS THAT SHOULD BE ANSWERED BEFORE YOU BUILD," intended primarily to help those about to build, raises questions the answers to which are important to many manufacturers who have building operations farthest from their minds. A single idea from this booklet may mean much to you. *Why not be prepared to talk about something entirely out of the "corner cutting" category at your Annual Meeting?* Wire, phone or write—no obligation, of course.

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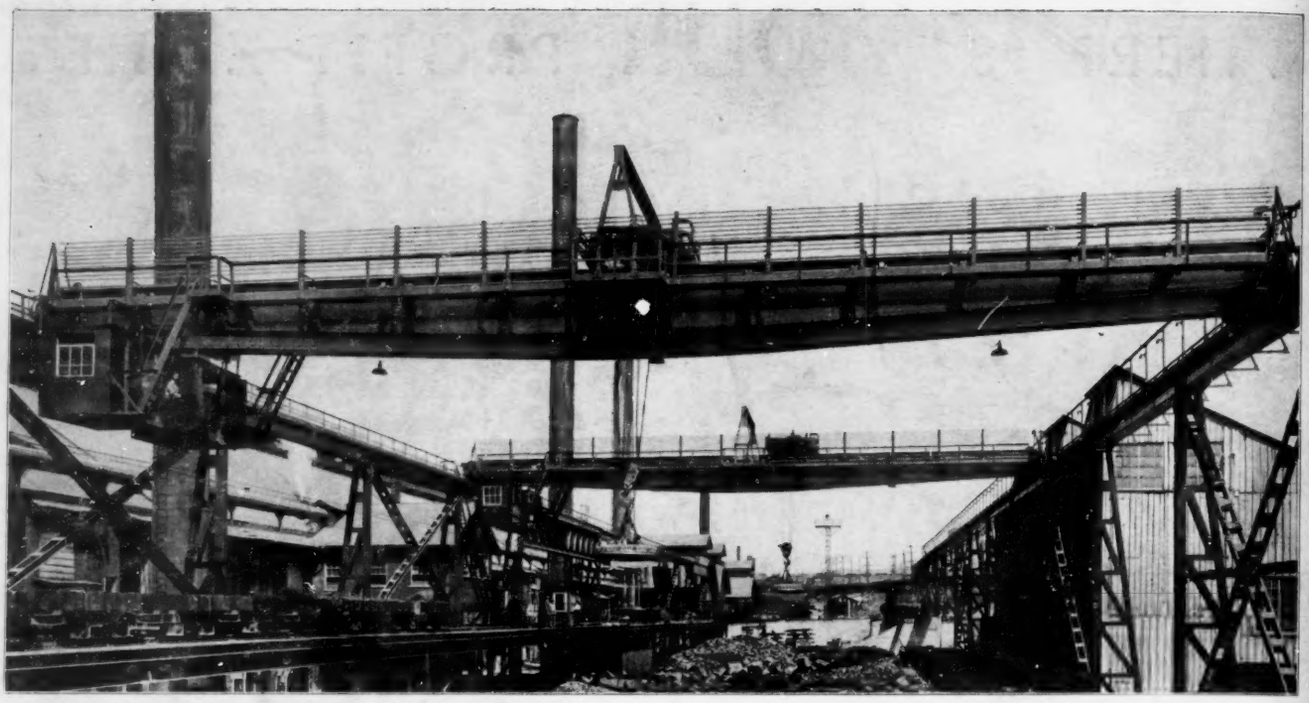

Every Nickel Alloy Grid Resistor *is guaranteed against breakage*

Severe shock and vibration on overhead traveling cranes, wall cranes, ore and coal bridges, charging machines, traveling mill tables and many other applications were formerly the cause of many cast iron resistor failures.

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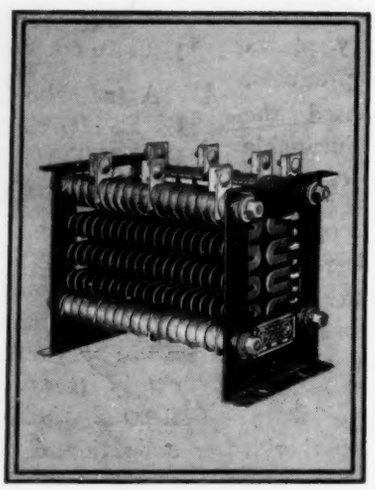

Specify EC&M Bulletin 940 Nickel Alloy Grid Resistors

Since Nickel Alloy Grid Resistors were first announced in October 1927, thousands of them have been shipped as unit parts of EC&M manual and automatic controllers for both alternating and direct current service.

This great number of resistors is maintaining production not only by eliminating breakage but also by preventing burnouts, because Nickel Alloy Grid Resistors have a high heat-radiating efficiency, and are capable of withstanding severe and frequent operation.

As a proof of their quality, EC&M guarantees to replace, free, any Nickel Alloy Grid Resistor broken either in service or in shipment within one year from date of purchase.

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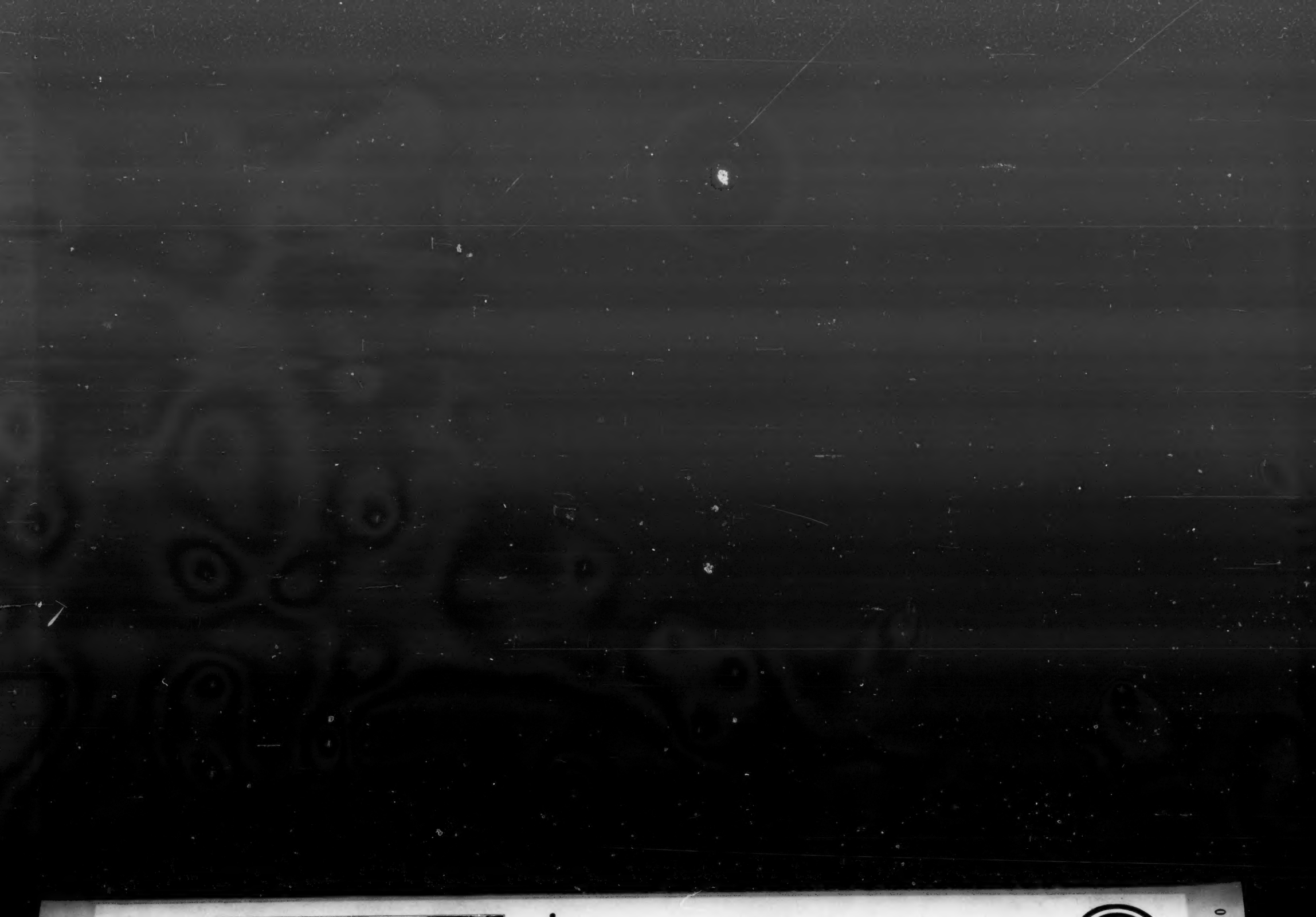
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